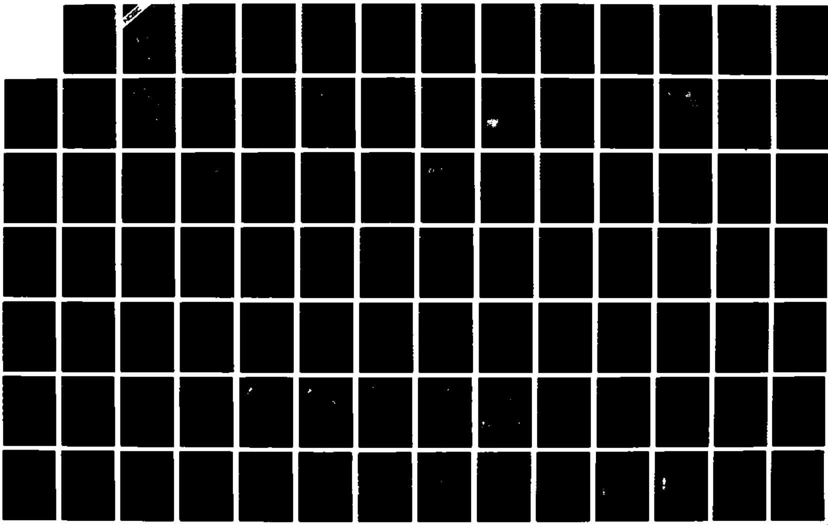
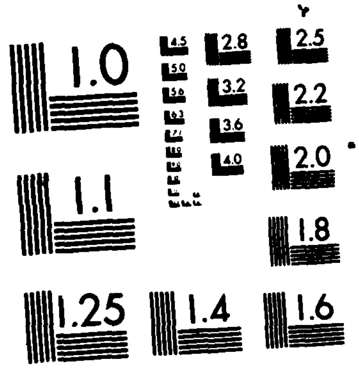
AD-A181 282 BUTYLTIN CONCENTRATIONS IN SELECTED US HARBOR SYSTEMS A BASELINE ASSESSMENT(U) NAVAL OCEAN SYSTEMS CENTER SAN DIEGO CA J G GROVHOUG ET AL. APR 87 NOSC/TR-1155 1/3

UNCLASSIFIED F/G 11/3 NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

DTIC FILE COPY (12)

NOSC TR 1155

NOSC

NAVAL OCEAN SYSTEMS CENTER San Diego, California 92152-5000

NOSC TR 1155

AD-A181 202

Technical Report 1155
April 1987

Butyltin Concentrations in Selected US Harbor Systems

A Baseline Assessment

J. G. Grovhoug
Naval Ocean Systems Center

R. L. Fransham
Computer Sciences Corporation

P. F. Seligman
Naval Ocean Systems Center

UNITED STATES NAVY · NAVAL OCEAN SYSTEMS CENTER

Approved for public release, distribution is unlimited

87 6 9 108

UNCLASSIFIED
SECURITY CLASSIFICATION OF THIS PAGE

A181202

REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION: UNCLASSIFIED

1b. RESTRICTIVE MARKINGS:

2a. SECURITY CLASSIFICATION AUTHORITY:

2b. DECLASSIFICATION/DOWNGRADING SCHEDULE:

3. DISTRIBUTION/AVAILABILITY OF REPORT: Approved for public release; distribution is unlimited.

4. PERFORMING ORGANIZATION REPORT NUMBER(S): NOSC TR 1155

5. MONITORING ORGANIZATION REPORT NUMBER(S):

6a. NAME OF PERFORMING ORGANIZATION: Naval Ocean Systems Center

6b. OFFICE SYMBOL (if applicable): Code 522

7a. NAME OF MONITORING ORGANIZATION:

6c. ADDRESS (City, State and ZIP Code): San Diego, CA 92152-5000

7b. ADDRESS (City, State and ZIP Code):

8a. NAME OF FUNDING/SPONSORING ORGANIZATION: David W. Taylor Laboratory, Naval Ship Research & Development Center; Office of Chief of Naval Research

8b. OFFICE SYMBOL (if applicable): DTNSRDC-2759; OCNR-126

9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER: N00167-84-WR-4-0028

8c. ADDRESS (City, State and ZIP Code): Annapolis, MD 21402

10. SOURCE OF FUNDING NUMBERS

PROGRAM ELEMENT NO	PROJECT NO	TASK NO	AGENCY ACCESSION NO
63724N	Z0838	ME-38	DN888 749

11. TITLE (include Security Classification): Butyltin Compound Concentrations in Selected US Harbor Systems A Baseline Assessment

12. PERSONAL AUTHOR(S): J.G. Grovhoug, R.L. Fransham, and P.F. Seligman

13a. TYPE OF REPORT: Final

13b. TIME COVERED: FROM 1984 TO 1986

14. DATE OF REPORT (Year, Month, Day): April 1987

15. PAGE COUNT: 201

16. SUPPLEMENTARY NOTATION:

17. COSATI CODES

FIELD	GROUP	SUB-GROUP

18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number): Tributyltin (TBT), Antifouling coatings, Organotin, Environmental monitoring,

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

This report summarizes organotin environmental concentrations collected during 15 harbor baseline surveys, including analytical results for surface water, sediment, and tissue samples. These efforts demonstrated that measurable amounts of organotin compounds are detectable, primarily near civilian, commercial, or recreational boat/ship repair facilities or mooring areas and marinas. Impacted sites near vessels coated with TBT coatings generally showed increases in tissue and sediment sample values as well as in the water column. These studies are central to the U.S. Navy's program for implementing organotin antifouling coatings on the future Fleet.

Keywords:

20. DISTRIBUTION/AVAILABILITY OF ABSTRACT: ☐ UNCLASSIFIED/UNLIMITED ☒ SAME AS RPT ☐ DTIC USERS

21. ABSTRACT SECURITY CLASSIFICATION: UNCLASSIFIED

22a. NAME OF RESPONSIBLE INDIVIDUAL: J.G. Grovhoug

22b. TELEPHONE (include Area Code): (808) 254-4464

22c. OFFICE SYMBOL: Code 522

DD FORM 1473, 84 JAN

83 APR EDITION MAY BE USED UNTIL EXHAUSTED
ALL OTHER EDITIONS ARE OBSOLETE

UNCLASSIFIED
SECURITY CLASSIFICATION OF THIS PAGE

EXECUTIVE SUMMARY

This report summarizes butyltin concentrations in marine samples collected during 15 harbor baseline surveys performed over a 3-year period, 1984 to 1986. Major US naval and commercial harbor facilities surveyed were San Diego Bay, Los Angeles-Long Beach Harbor Complex, Mare Island Strait and San Francisco Bay Complex (including Alameda, Treasure Island, and Fishermen's Wharf), California; Puget Sound Naval Shipyard, Bremerton, Washington; Pearl Harbor and Honolulu Harbor/Kewalo Basin, Hawaii; Mayport-St. John's River Complex, Florida; Charleston Naval Complex, South Carolina; Norfolk Naval Complex (including Norfolk Naval Shipyard) and Little Creek Amphibious Base, Virginia; Philadelphia, Pennsylvania; Newport, Rhode Island; New London-Groton, Connecticut; and Portsmouth, New Hampshire. Analytical results providing concentrations of mono-, di-, and tributylin for surface water, and solvent extractable tin for sediment and tissue samples are reported in this document. Supporting field collection data (including date, time, depth, latitude, longitude, and remarks) are reported to provide a more complete record during these surveys.

These baseline efforts have demonstrated that measurable amounts of organotin compounds are presently detectable, primarily near civilian, commercial, or recreational boat/ship repair facilities or mooring areas and marinas (such as Shelter Island in San Diego Bay). Analytical capabilities to measure parts-per-trillion levels in the water column have been developed. Many sites had no measurable organotin compounds (<0.005 micrograms/liter); however, these locations will provide important reference points for future monitoring studies. Impacted sites near vessels coated with tributyltin (TBT) generally showed increases in tissue and sediment sample values as well as in the water column. Enclosed areas with high concentrations of yachts or commercial vessels varied from 0.05 to 0.35 micrograms TBT/liter. Sediment organotin concentrations (as solvent extractable tin) were about three orders of magnitude higher than the water column TBT values, while tissue dry weight values (mussel and oyster) were roughly four orders of magnitude above water column values.

In 3 of 15 surveyed harbors, no detectable TBT was measured. In a total of 455 seawater measurements, 116 samples (25.5 percent) had measurable TBT. Twenty-three samples (5.1 percent) exhibited levels $\geq$ 0.05 micrograms/l TBT; and all of these were either within yacht harbors, small boat basins, or adjacent to TBT-coated hulls or drydocks.

The organotin harbor baseline surveys and analytical procedures described in this report are central to the US Navy's program for implementing organotin antifouling coatings on a modernized naval fleet in the future. This baseline inventory provides necessary reference points for the prediction and future assessment of organotin loading in major harbors used by commercial, recreational, and naval vessels.

CONTENTS

ILLUSTRATIONS

Figure

TABLES

BACKGROUND

During the next few years, the Navy intends to start gradually using organotin antifouling (AF) paints that contain tributyltin (TBT) as a biocide. These commercially available AF coatings have proven significantly more effective than the present copper-based coatings (Gerard Bohlander, Naval Ship Research & Development Center (NSRDC) Test Ship Program, personal communication, May 1983). Naval Sea Systems Command has determined that substantial fuel savings and increases in fleetwide operational readiness would occur as a result of the Navy's full use of organotin. Operational Navy vessels are now hampered by excessive hull biofouling in many geographic regions. The use of more effective AF paints will significantly extend the periods between required dry-dockings and will result directly in a large cost savings to the Navy.

In accordance with the National Environmental Policy Act, an Environmental Assessment (EA) has been submitted (Federal Register Vol. 50, No. 120, 21 June, 1985). Based on a review of existing data for each major Navy port or harbor, dynamic estuarine model predictions, and projected organotin loading estimates, this environmental assessment projects no significant organotin impacts from naval use of organotin AF paint. Ongoing studies will provide additional data to refine the impact assessment for an update in 1988.

The EA dictates that the Navy monitor the major harbors in which it operates to help insure that water column organotin concentrations do not exceed a safety limit of 0.05 μgTBT/l. This report describes background organotin levels in harbors and estuaries before implementation of TBT-based coatings by the fleet. The design of a subsequent monitoring program should be tempered by these data.

INTRODUCTION

With the anticipated introduction of TBT-based AF paints for Navy use, some estimation of the environmental concentrations, persistence, fate, and effects of these compounds is required. The following hypotheses guided the experimental design and approach to these organotin harbor baseline studies.

1. Regions dominated by Naval vessel traffic were predicted to have minimal or no detectable organotin levels in water, sediment, or tissue samples.

2. Areas in harbors and estuaries with extensive commercial or recreational vessel traffic or berthing areas would have measurable amounts of organotins. Organotin levels would be higher at those sites with greater commercial shipping or recreational vessel densities. Particular sources of organotin compounds such as dry docks and boat repair facilities may be detectable in survey data.

3. Concentrations of various butylin species (e.g., monobutyltin versus dibutyltin versus tributyltin compounds) would vary among sites and harbors, depending on the source of the organotin loading (diffuse, such as hull leachates, versus localized point sources, such as drydocks) and the duration of the organotin loading.

Navy use of TBT-based AF paints is only in the testing phase at this time. We should differentiate between total organotin and the concentration of TBT and its degradation products, di- and monobutyltin, which are at least one to two orders of

magnitude less toxic, respectively (Zuckerman et al., 1978, & Hall & Pinkney, 1985). Currently, most Navy ship hulls are coated with copper-based AF paints. Therefore, the organotin loading during the baseline sampling period in regions of harbors used by Navy ships was expected to be negligible. Harbors primarily used and controlled by naval commands (such as Pearl Harbor and Mayport) should demonstrate this hypothesis most clearly. At mixed-use harbor complexes (such as San Diego and Norfolk), areas dominated by naval use should exhibit lower organotin concentrations than the areas used by commercial or privately owned and operated recreational vessels. Some organotin compounds may be delivered into harbors from drainage or sewage treatment systems where organotin compounds may be released from various sources such as agrochemicals, wood preservatives, disinfectants, plastics stabilizers, fungicides, and other biocides (Brinckman, 1984; Boettner et al., 1984; Davies & Smith, 1980).

Organotin AF paints have been in use for many years from several commercial sources (including Devoe Marine, Hemple Marine Paints Inc., International Paints Company, and Jotun Marine Coatings Inc.) and are widely applied to commercial and recreational vessels of all classes and sizes. More than half of all major oceangoing vessels worldwide currently use organotin coatings (International Paint Corporation and Devoe Marine Coatings, personal communication, August 1985). Harbor areas with commercial vessel traffic or moorage are likely to exhibit significant loading of organotin compounds as leachate or particulates (including paint chips) from AF coatings. Commercial and naval vessel traffic is usually dominated by relatively short pierside stays except when adjacent to repair facilities. In contrast, smaller vessels are usually pierside for considerably longer periods in marinas and small boat basins.

A standardized estimation of organotin loading could be derived from data on paint type, wetted hull surface area, and vessels' duration in a specific harbor to yield a square-meter-day-per-year value for organotin loading. An initial examination of organotin loading was attempted for commercial ships in Honolulu Harbor, Hawaii. Ship movement and days in port data were readily obtained; however, specific information concerning types of AF paint applied to underwater hull areas was extremely difficult to obtain and impossible to verify. A similar study was performed in southern California (Young et al., 1979) to evaluate heavy metal inputs into harbors resulting from vessel-related activities. Large commercial vessels (such as those in Honolulu Harbor), we predict, will provide measurable amounts of butyltins in certain harbor regions even though individual pierside stays are relatively short. The contribution of organotin loading from point sources such as commercial dry docks, boat repair, or repainting facilities is another potential major source of organotin input to enclosed estuarine environments (Carl Adema, NSRDC, personal communication, April 1985).

Recent studies have suggested that in the natural environment organotin compounds undergo degradative reactions leading to the sequential loss of various alkyl groups with time and reducing their toxicity (Guard et al., 1981; Maguire et al., 1983; Henderson, unpublished data; Seligman, et al. 1986b). One set of reactions for a common organotin compound, tributyltin oxide (TBTO), results in the stepwise debutylation (from tri-, to di-, to monobutyltin) and, eventually, to inorganic tin (Maguire et al., 1983; Barug, 1982). These reactions are probably caused by a combination of abiotic and biotic degradation processes and are being addressed in separate studies at the Naval Ocean Systems Center (NOSC) as part of this program (see Dooley & Homer, 1983, & Seligman, et al., 1986). The resulting mixture of

organotin compounds from the introduction of a single organotin source is an area of interest to this study. Immediate introduction of organotin compounds into the natural environment are likely to yield samples dominated by one compound (such as TBTO), but chronic release of organotin compounds (as from the sediments in harbors) will likely yield samples with several measurable organotin components.

A comprehensive review of Navy-used harbors was made before plans for the initial organotin baseline survey were formulated. A priority matrix was designed for a 3-year study using the best available information for evaluation (see table 1).

Table 1. OTHBS harbor selection priority matrix.

	Criteria						Priority		
Harbor	A	B	C	D	E	Total[1]	FY84	FY85	FY86
Bremerton, WA	1	4	3	4	1	40	-	2	-
Charleston, SC	4	3	3	4	3	70	-	1	-
Little Creek, VA	3	0	0	3	5	24	5	-	-
Long Beach, CA	2	3	3	2	1	24	-	4	-
Mare Island, CA[2]	1	4	0	4	5	45	4	-	-
Mayport, FL	3	0	3	3	3	36	-	3	-
New London, CT[2]	3	1	0	4	1	20	-	5	-
Newport, RI	1	0	0	3	3	6	-	-	3
Norfolk, VA	5	5	5	3	3	90	2	-	-
Pearl Harbor, HI	4	3	5	2	3	60	3	-	-
Philadelphia, PA	1	4	3	1	1	16	-	-	1
Portsmouth, NH	0	2	0	4	1	10	-	-	2
San Diego, CA	5	2	5	4	5	108	1	-	-
San Francisco, CA	2	0	0	2	1	6	-	-	4

[1] Total = (A + B + C) X (D + E)
[2] Used primarily by submarine forces

SCORING KEY

	Score					
Criteria	0	1	2	3	4	5
A = Number of homeported vessels	0-5	6-10	11-20	21-40	41-75	>75
B = Number of operational Navy dry docks (including AFDMs)	0	1	2-3	4-5	6-7	> 7
C = Projected number of TBT-painted vessels during FY84-86	0				1-3	> 3
D = Ecological resources (nursery areas, wildlife habitat, etc.)		negligible		moderate	superior	
E = Projected TBT levels (flushing models water quality, etc.)		negligible		low	moderate	

The project test plan was completed after onsite presurvey visits were conducted in November 1983. During the 3-year period, baseline survey personnel and methodologies remained consistent; however, certain refinements in field and analytical procedures occurred. In this report, sediment and tissue data are reported for general comparison with water values for the 1984 baseline samples only.

The results of organotin determinations for each harbor surveyed provide initial points of reference before use of organotin paints by the fleet. These data represent the conditions extant in major naval and maritime ports at the time of these surveys. It is understood that temporal and seasonal variations in butyltin concentrations are likely. This initial, geographically broad baseline effort was designed to gain an understanding of possible source regions within harbors and to develop background information on general organotin levels in regions of potential future Navy input. Thus, this study is spatially intensive rather than temporally intensive. Future monitoring efforts will investigate both short- and long-term temporal variability. A general description of each location is followed by a discussion of patterns in water, sediment, and tissue data. Figures depicting tin levels of sampling stations at each harbor, field data sheet summaries, and tables listing organotin values for each sample analyzed are provided in the appendices of this report.

Organotin water column data for each harbor are described. Also these data are displayed on charts showing the locations where TBT values were (1) not detectable (<0.005 µgTBT/l), (2) measurable in trace amounts (0.005-0.029 µgTBT/l), (3) relatively low amounts (0.030-0.049 µgTBT/l), (4) moderate amounts (0.050-0.099 µgTBT/l), and (5) highest amounts measured (0.10-0.35 µgTBT/l). A printout is provided in appendix B that describes pertinent water, sediment, and tissue collection field data from field notebooks and NOSC Organotin Harbor Baseline Survey (OTHBS) smooth data sheet summaries. Tables generated directly from the data base showing values for organotin species present and a total butyltin value for water samples at each station can be found in appendix C. A discussion of measurable total butyltin patterns for each harbor concludes the water column section.

Butyltin sediment data for selected harbors are presented in several ways. Descriptive, tabular, and graphic methods are used to display baseline sediment data. Figures displaying levels of total organic solvent extractable tin (ngSn/g dry wt) present in sediments are shown in appendix A. Five ranges of values were selected to display sediment tin levels: (1) below detectable limits (<10.0 ngSn/g), (2) very low, but measurable levels (10.0-25.9 ngSn/g), (3) low levels (26.0-99.9 ngSn/g), (4) moderate levels (100.0-199.9 ngSn/g), and (5) highest amounts measured (200.0-750.0 ngSn/g) of total organic solvent extractable tin.

Tissue data for selected harbors are discussed in the site specific sections and presented in figures in appendix A. Again, five ranges of values were arbitrarily selected to depict organotin levels in resident bivalve molluscs collected from each harbor: (1) below measurable limits (<0.5 µgSn/g), (2) low, yet measurable levels (0.5-0.99 µgSn/g), (3) moderate levels (1.0-2.49 µgSn/g), (4) moderately high levels (2.5-3.9 µgSn/g), and (5) the highest tissue values measured during this baseline (4.0-7.85 µgSn/g). Values are reported in micrograms per gram dry tissue weight for total organic solvent extractable tin. Equivalent wet weight total organic solvent extractable tin level ranges, based on a 16-percent dry:wet tissue weight ratio, are (1) <0.08 µgSn/g, (2) 0.08-15 µgSn/g, (3) 0.16-0.39 µgSn/g, (4) 0.40-0.63 µgSn/g, and (5) 0.64-1.26 µgSn/g. Mussels were collected from west coast harbors, Portsmouth, Newport,

and New London. Oyster tissues were collected from Pearl Harbor, Honolulu Harbor, Mayport, Charleston, Little Creek, and the Norfolk Naval Complex.

METHODS AND MATERIALS

SURVEY METHODOLOGY

Sampling site selection during the organotin baseline survey activities consisted of choosing sites from each of three major regions of predetermined significance: (1) locations with moderate to extensive naval use and operational activities (such as naval piers or moorage areas), (2) regions with high commercial, municipal, recreational, or private use (such as commercial boat or ship repair facilities or marinas removed from naval activities), and (3) locations of special ecological value (e.g., fishing, migratory, nursery, or spawning grounds) to serve as pristine areas (unimpacted with respect to organotin in or adjacent to each major harbor surveyed).

Field sampling was performed by NOSC Hawaii Lab field survey team members using locally available surface support craft (usually provided by an Explosives Ordnance Disposal Team). Preliminary onsite meetings were held with various individuals (such as port services officers, Naval shipyard paint chemists, natural resource planners, dredging specialists, etc.) to aid in the selection of optimum sampling locations. Meetings with universities and state and Federal environmental agencies were also conducted to determine the location of ecologically significant areas (such as spawning grounds, nursery areas, shellfish beds, critical habitats, and recreational or commercial fishing areas). A waterborne site reconnaissance was usually performed before the team selected the final stations at the beginning of each baseline survey.

Potential permanent monitoring stations were selected from the total array of sampling sites at each harbor after the baseline survey was completed. These were locations where the survey team recommended establishing future monitoring stations. Suggested monitoring stations were generally selected at sites where water, sediment, and tissue samples could be collected at nearly the same location (see appendix D for examples). These stations include sampling sites within a radius of 75 meters. Reported locations (specific latitudes and longitudes; see appendix B) represent the center of these sites. These permanent stations will constitute the primary monitoring sites after organotin implementation begins. In some cases, additional stations will be monitored to provide data for special interest areas.

Water samples were collected one-half meter below the surface and stored in clean, well-rinsed, 1-l polycarbonate containers. All samples were immediately labeled, placed in chilled ice chests in the field, and were frozen upon return from sampling activities, usually within several hours of collection. In harbors where significant vertical stratification was present, additional water samples were collected from deeper water masses. Temperature and salinity measurements were taken with portable field instruments to determine the degree, if any, of vertical stratification of the water column at all harbors surveyed. In Hawaii, vertical stratification was negligible at the time of baseline sampling.

A stainless steel Van-Veen grab was used to collect sediment samples. Each grab sample consisting of about 3 to 4 liters of sediment was emptied onto a clean fiberglass tray on board the surface support craft. Approximately 150 ml of sediment were then carefully scooped from the upper 3-cm portion of the sample and placed into

a double-labeled, polyethylene Ziplock bag. Samples were placed in prechilled, insulated coolers and frozen soon after return from field collecting activities. Water depths during sediment collection were measured using markings on the grab sampler line and verified periodically by fathometer readings. Sediment samples were collected in triplicate at each station to provide a measure of spatial homogeneity for sediments at ports surveyed. Usually, three separate grabs were made; however, certain locations were extremely difficult to sample due to depth, currents, or sediment composition. In these cases three samples were removed from the contents of one grab. At several locations where grab sampling was not possible, sediment samples were collected by divers who scooped sediment into a clean polyethylene bucket. Variations in normal sample collection procedures were recorded in field notes.

Entire individuals from either of two species of cosmopolitan bivalves, the bay mussel (*Mytilus edulis*) or the American oyster (*Crassostrea virginica*), were collected from available vertical substrata (usually wharfs or pilings) at selected areas in each major port surveyed. An attempt was made to collect bivalves from approximately the same tidal height at each station (mean lower low water (MLLW), plus or minus one-half meter). Each of these filter-feeding bivalve species are known to concentrate a wide range of metals from surrounding waters, and their selection as "sentinel" organisms for "mussel watch" efforts (Goldberg et al., 1978; Farrington, 1983) has direct application to the present baseline survey. Mussel watch sampling stations have been established in or adjacent to most of the harbors under consideration for organotin survey efforts. If bay mussels were present in the area, they were the primary species for collection. When no mussels were present, oysters were collected for tissue analysis. At two survey locations, Mare Island Strait (Napa River) and Philadelphia (Delaware and Schuylkill Rivers), neither mussels nor oysters were available. The lack of target bivalves in these two riverine areas is probably due to reduced salinities.

Five samples consisting of from 1 to 15 individuals (depending on individual size to provide a minimum of 10 ml of pooled wet tissue volume) were obtained from selected sites. An attempt was made to select individuals of about the same size in each harbor area. Lengths were recorded for each whole bivalve prior to dissection. Soft tissues were dissected from their shells on site and frozen in 85-ml polycarbonate Oak Ridge centrifuge tubes. These dissections were performed using stainless steel, Teflon, or polyethylene instruments, and particular care was taken to avoid contaminating samples. Frozen tissue samples were delivered to NOSC in San Diego for analysis.

ANALYTICAL METHODS

All sample analyses were performed by NOSC personnel at the San Diego laboratory, which has been specially staffed and equipped to conduct trace level determinations of organotin compounds. Water sample analyses were given the highest initial priority during these analyses. Butyltin data for water samples from 15 major US harbors and adjacent waters have been analyzed and are reported here. Sediment samples were collected from all 15 harbor areas and selectively analyzed during the analytical technique development and refinement phases of this study. Tissue samples were collected from 13 harbor areas and complete (water, sediment, and tissue) analytical data are available for 5 of these regions.

Seawater Analysis

The hydride derivatization method (HDAA) of producing volatile tin species for detection by modified hydrogen flame atomic absorption spectrophotometry used in this study was a synthesis of methods described by Braman and Tompkins (1979) and Hodge, Seidel, and Goldberg (1979) and as modified by this laboratory. Inorganic and organotin compounds in seawater are derivatized to inorganic and the respective alkyltin hydrides by sodium borohydride ($NaBH_4$) before detection. A sample is placed into a 500-ml gas washing bottle, and acetic acid (2N) is added to lower the solution pH to 5.0-5.5. Initially, the sample was purged for 5 minutes with helium to remove oxygen prior to the addition of 4-percent $NaBH_4$ in 1-percent sodium hydroxide (NaOH). Recently, however, this prepurge has been determined to be unnecessary. The tin hydrides are purged from solution and trapped in a glass U-tube packed with either quartz wool or, more recently, 3-percent OV1 Chromosorb. The U-tube is immersed in liquid nitrogen to a level just above the packing material during the purge and trap cycle. The sample is purged for 5 minutes after addition of $NaBH_4$ to insure the maximum removal of tin hydrides from solution. The trap is then removed from the liquid nitrogen bath, and tin species are detected sequentially according to their boiling points as they volatilize from the trap into the carrier gas. Normally, in the absence of other alkyltins, the first three tin species to volatilize from the trap as it comes to room temperature are tin hydride (SnH_4), butyltin trihydride ($BuSnH_3$), and dibutyltin dihydride (Bu_2SnH_2). These species are carried into a quartz burner and are detected by an atomic absorption spectrophotometer (Buck Instruments, GBC SB90000). Dibutyltin detection may be improved by placing the trap in a 50°C water bath, thus causing a more rapid release of dibutyltin dihydride, which results in a significantly sharper peak. Gas flow rates are 220/140/40 ml per minute with respect to hydrogen, air, and helium. The analytical wavelength is set at 286.3 nm.

Volatilization of tributyltin hydride (Bu_3SnH) requires heating the trap in an oil bath at 140°C. Standardization is accomplished by the addition of the appropriate alkyltin standard (in ethyl alcohol, ethanol (ETOH) carrier) to the unknown or by calibration with standard curves. Calculations are based on peak area integration. The detection limit for inorganic tin hydride is 0.001 μg/l. Mono-, di-, and tributyltin hydrides may be detected at 0.005 μg/l, and recent improvements in the analytical system allow for the detection of levels to 0.001 μg/l. The condition of the Chromosorb trap and the number of samples processed may cause small variations in the detection limits.

Confirmation of TBT in a natural environmental seawater sample (collected from Shelter Island Yacht Basin in San Diego Bay) has been made by gas chromatography/mass spectroscopy (GC/MS) measurement of the hybridized species trapped in hexane (Valkirs et al., 1985). Intercalibration studies with the National Bureau of Standards have verified the accuracy of organotin determinations using both HDAA and graphite furnace atomic absorption spectroscopy (GFAAS) analytical methods (Blair et al., 1986, & Valkirs, et al., 1987).

The values reported in this study by HDAA analysis are considered "hydride reducible" in that part of any environmental sample may contain butyltins unavailable for derivatization by sodium borohydride. Additional compounds (e.g., diesel fuels or sulfides) may exist in natural seawater samples that may interfere with the borohydride derivatization process, or cause losses of butyltin hydrides to the internal surfaces of the analytical system.

To evaluate the presence of potential matrix interferences in samples collected from many diverse areas associated with naval activity, standard additions were made to subsets of samples. Differences in butyltin concentrations determined by external calibration curve calculations (values reported through this study) and standard additions to replicate samples identified such areas. Generally, few areas were found where large differences between calibration methods existed.

Sediment Analysis

Wet sediment aliquots (1-2 grams) were placed into preweighed borosilicate glass scintillation vials. One milliliter of 1-percent HCl (Ultrex) was added with 10 milliliters of MIBK (methylisobutyl ketone). The vials were placed on a rotary shaker (Cole Parmer, Roto-torque) for 16 to 24 hours. The organic solvent extract was analyzed by GFAAS by previously reported methods (Valkirs et al., 1985). Separate portions of each sediment sample were used to determine the wet-to-dry ratio, and results are reported as tin concentration with respect to the dry weight of the material. Seven spike recovery experiments were conducted in the range of 0.02 to 3.6 ppm added TBT compound. Mean recovery was 86.4 percent (stdv: 14.3) with a mean coefficient of variation of 11.3. Recovery ranged from 63 to 110 percent. Results are reported as dry sediment values, ng/g (ppb) of total organic solvent extractable tin. Note that total solvent extractable tin is only an estimate of organotin presence owing to possible nonalkyl tins that may be associated with the solvent extract. Actual sediment TBT content is expected to be substantially less than the values presented. Future sediment analysis will include speciation of the butyltin fraction.

Tissue Analysis

Tissues (either bay mussel or oyster soft parts) were thawed, removed from the shell, and then homogenized with a Tekmar Tissumizer. The homogenized tissue was then frozen and stored in either borosilicate glass scintillation vials or in polycarbonate centrifuge tubes before extraction. Extractions were performed in borosilicate glass test tubes closed with two pieces of Teflon tape under polypropylene caps. A solution of 5-ml methylene chloride and 1-ml hydrochloric acid are added, and the samples are placed on a rotary shaker overnight, then centrifuged for 10 minutes at 4000 rpm to separate the tissue slurry from the organic solvent and extracted tin. These are pipetted into clean borosilicate glass test tubes, and then the total organic solvent extractable tin, after dilution with MIBK, is measured by GFAAS. Results were reported as $\mu g/g$ (ppm) dry weight and as $\mu g/g$ wet weight for total solvent extractable tin. Again, this represents only the total extractable tin; TBT values would be signficantly lower. The amount of Bu_3Sn can be determined after reextraction with 3-percent aqueous NaOH by GFAAS or determined by Grignard derivatization followed by analysis by gas chromatography.

SITE SPECIFIC SURVEY RESULTS

SAN DIEGO BAY, CALIFORNIA

General

San Diego Bay is a crescent-shaped, semienclosed bay on the coast of southern California. The bay is about 15 miles long (28 km) and varies in width from 1/4 to 2-1/2 miles (0.5-4.6 km). The surface area is approximately 18-1/2 square miles or 47

sq km (Peeling, 1975). More than 100 commissioned vessels of the Pacific Fleet are homeported in the area. Nearly all classes of Navy surface ships and submarines are either homeported or regularly visit the San Diego Bay Naval Complex. Navy berthing and mooring areas are located at the Naval Station, Naval Air Station North Island, Naval Amphibious Base Coronado, Naval Ocean Systems Center (Point Loma), Fleet Training Group San Diego, Naval Submarine Support Facility (Ballast Point), and the Naval Supply Center. Additionally, San Diego Bay is a multiple-use region that supports a commercial port, private shipyards, recreational boating and repair facilities, deep-sea commercial and sport fishing, marine habitat for many species of fishes, birds, and invertebrates, and shellfish harvesting.

Commercial deep-water wharfs and piers are owned and operated by the Port of San Diego along the north channel region, and several large marinas are located in San Diego Bay. Shelter Island Yacht Basin and Commercial Basin, located in the northwestern part of the bay (see figure 1), can accommodate more than 2,800 vessels (up to 800 tons in size in the Commercial Basin). Harbor Island is located one-half mile northeast of Shelter Island and can accommodate about 1,600 vessels in its western basin. The Fifth Avenue (Intercontinental) Marina, situated on the northeastern rim of the bay; Glorietta Bay, located on the western rim of San Diego Bay at the southeastern end of North Island; the Chula Vista Small Boat Basin; and the Coronado Cays Marina provide berths for approximately 1,000 vessels. A total of 6,000 pleasure craft and a large commercial and charter vessel fleet are permanently berthed in San Diego Bay. Many of these privately owned vessels have been painted with organotin AF paints and, therefore, represent a significant source of TBT input into San Diego Bay.

Current patterns in San Diego Bay generally flow along the directions of the channels. Velocities vary from 1/2 to 3 knots, depending on the state of the tide. The maximum tidal range in San Diego Bay is about 8 feet (2.4 meters). Freshwater input is minimal and near-oceanic salinities exist throughout the bay.

San Diego Bay contains a variety of marine organisms, including many commercially and recreationally important species using the bay for reproduction and feeding (Peeling, 1975). Benthic invertebrate fauna diversity is significant, with over 200 different species reported to inhabit the area. Several species of shellfish, including crabs, lobsters, clams, and abalone, are recreationally important. Ghost shrimp (Callianassidae) and two species of clams are commercially harvested for bait within the bay, primarily in the southern portion. The California spiny lobster (*Panulirus interruptus*) uses San Diego Bay for reproductive purposes; however, commercial harvesting is not permitted within the bay. Fish populations are healthy with more than 80 species feeding and spawning in the bay. Ecologically significant uses of the bay are ocean commercial and sport fishing, shellfish harvesting, and habitat for several species of fishes, avifauna, and invertebrates.

Because of the size of the Navy fleet in San Diego Bay, limited circulation patterns, and other considerations, a more extensive baseline survey was conducted. From 14 to 24 February 1984, 52 sampling stations were visited in San Diego Bay. Specific water, sediment, and tissue collection sites were chosen in an attempt to sample all major ecological regions within the bay. Sampling stations established in San Diego Bay during this survey are shown in figure 1. Temporal, locational and descriptive sampling information is listed by station in appendix B, table B-1.

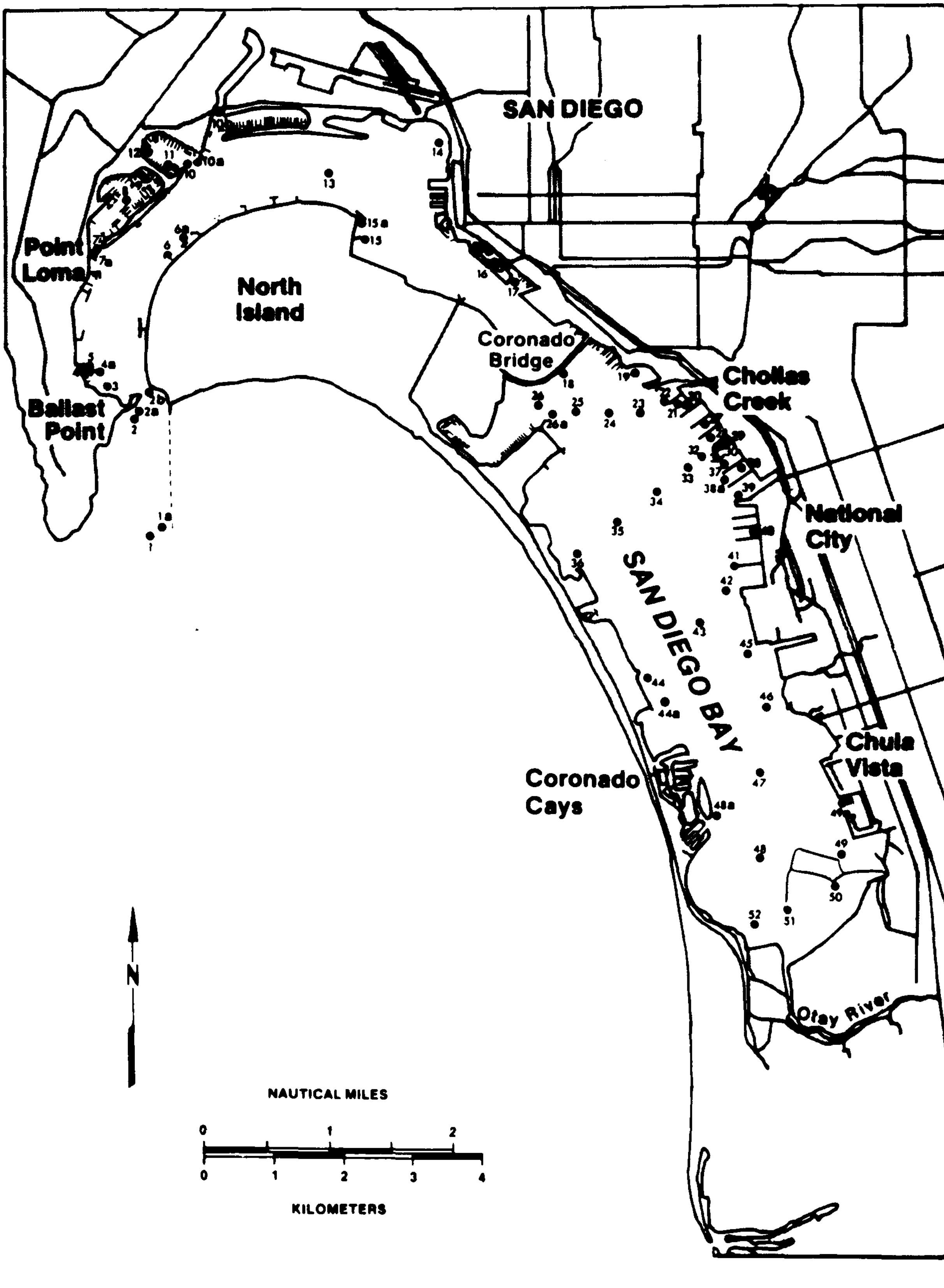


Figure 1. Sample station locations: San Diego Bay.

Water

Out of 44 water sampling stations in San Diego Bay, 95 percent contained measurable concentrations of TBT. The highest levels were measured in the Shelter Island and Commercial Basin Yacht Harbor complex with concentrations varying from 0.19 to 0.35 µgTBT/l (appendix A, figure A-1). Low, but measurable amounts of organotin compounds (0.03-0.05 µgTBT/l) were found in areas of the tuna fleet berths (station 14), a newly opened marina (station 16), at a commercial shipyard (station 17), and at the Submarine Base at Ballast Point (station 4). Trace levels (0.01-0.02 µgTBT/l) were found throughout the bay, though only a few stations in the south bay showed measurable quantities (at least 0.005 µg/l) of TBT. Most of the water samples collected within the area of the Naval Station contained from 0.01 to 0.02 µgTBT/l.

Surface water data for San Diego Bay are summarized in appendix C, table C-1(w). In general, dibutyltin concentrations in seawater were about equal to TBT. Monobutyltin was measured less frequently and was most often present only in trace amounts. Measurable amounts of organotin compounds are present in surface waters from most regions of San Diego Bay representing primarily private sector sources.

Sediment

Of the 156 sediment samples collected from San Diego Bay (3 samples at each of 52 stations), 71 sample analyses have been completed. Measurable organotin levels were present in 75 percent of the samples analyzed. Eighteen of the samples contained no measurable tin (values of <10 ngSn/g, which equaled detection limits under the specified extraction conditions), while measurable concentrations of tin were present in 53 sediment samples from San Diego Bay. The highest levels of solvent extractable tin in sediments were found in the Shelter Island and Commercial Basin areas (219-537 ng/g and 199-746 ng/g, respectively), adjacent to the Campbell Shipyard floating drydock (144-215 ng/g), and at the north end of the Naval Station at stations 22 and 27 (61-197 ng/g). See appendix A, figure A-2 for locations. Sediment data for San Diego Bay are summarized in appendix C, table C-1(s). As observed in the water column data, sediment values were lowest or below detection limits in south San Diego Bay, where coating-related impacts from vessels are negligible.

Tissues

Bay mussel (*Mytilus edulis*) samples were collected from San Diego Bay at 17 stations from 14 to 23 February 1984. Five replicate samples (consisting of soft tissues from 5 to 10 individuals) were analyzed for total organic solvent extractable tin by GFAAS procedures (see Methods and Materials -- Tissue Analysis section).

Measurable solvent extractable tin was present in all 85 pooled mussel tissue samples analyzed (appendix A, figure A-3). Appendix C, table C-1(t), presents a summary of these data. Significantly, no mussels were found inside either Shelter Island Marina or Commercial Basin. Although substrata are present and mussels abound at many other locations in the bay, we can surmise that water quality conditions preclude the occurrence of mussels in these two areas. Mussels collected at the entrance areas of both Shelter Island Marina (stations 7 and 7A) and Commercial Basin (stations 10 and 10B) were small and sparsely distributed. Tissue analyses (2.0-5.0 µgSn/g dry weight, 0.32-0.80 µgSn/g wet weight) from these stations yielded the

highest organotin concentrations of any stations in San Diego Bay. The lowest total solvent extractable tin tissue concentrations (<1.0 μgSn/g dry weight, <0.08 μgSn/g wet weight) were recorded from adjacent stations and toward the entrance channel (stations 2B, 4, 4A, and 6A). Other locales in the bay average 1.0 to 2.5 μgSn/g dry weight levels (0.16 to 0.40 μgSn/g wet weight), suggesting relatively low, nearly constant concentrations of organotins in central and south bay.

Martin et al. (1982) and the California State Water Resources Control Board (1982) discuss Mussel Watch studies conducted in San Diego Bay during 1979 through 1981. At one station located on the channel side of Shelter Island, mussels transplanted for 6 months significantly concentrated several trace metals (especially arsenic, copper, and mercury). Whether a similar pattern for organotin accumulation exists is presently unknown. Transplantation experiments may provide useful organotin uptake information if incorporated into future organotin monitoring studies in San Diego Bay and other regions.

LOS ANGELES/LONG BEACH HARBOR COMPLEX, CALIFORNIA

General

The Los Angeles/Long Beach harbor complex in San Pedro Bay includes the Long Beach Naval Shipyard and the Long Beach Naval Station at the southeastern portion of Terminal Island (see figure 2). The outer harbor area of San Pedro Bay is enclosed by a three-section breakwater. Naval activities in the area consist of the Long Beach Naval Station, a Shore Intermediate Maintainance Activity (SIMA), and the Long Beach Naval Shipyard located in the West Basin of Long Beach Middle Harbor, which is wholly within Navy jurisdiction and is protected by a large, curving mole. The Navy Fuel Depot, San Pedro, is located in the Watchorn Basin of the Los Angeles Outer Harbor.

The Port of Los Angeles comprises the western portion of the bay and its port area consists of Inner and Outer Harbors. The Port of Los Angeles is located to the north and west of Terminal Island. Fish Harbor is located on the southwest side of Terminal Island and contains several hundred commercial fishing and recreational vessels. Numerous large capacity marinas and commercial fishing boat basins are sited along either shoreline of the Cerritos and Los Angeles Channels and in the Los Angeles Outer Harbor. Long Beach Harbor comprises the eastern portion of San Pedro Bay and consists of Outer, Middle, and Inner Harbors. The Long Beach Inner Harbor, Middle Harbor, and Outer Harbor extend to the east and northeast of Terminal Island. The Long Beach Shoreline Marina, completed in 1982, contained approximately 1,700 vessels at the time of the baseline survey.

Currents generally follow the channel axes and rarely exceed 1 knot, although local variations may slightly exceed this velocity. Seiche activity and surge effect is common in Los Angeles Harbor and at its approaches at the entrances to Los Angeles and Cerritos Channels, while surge and seiche within the Navy-controlled West Basin is irregular. The bottom at most locations consists of mud or silt except in the outer harbors where sand is the primary bottom type. Fresh water influx into the region is seasonal and variable. Water quality is considered good in the outer harbor regions, yet poor in the Cerritos and Los Angeles Channels.

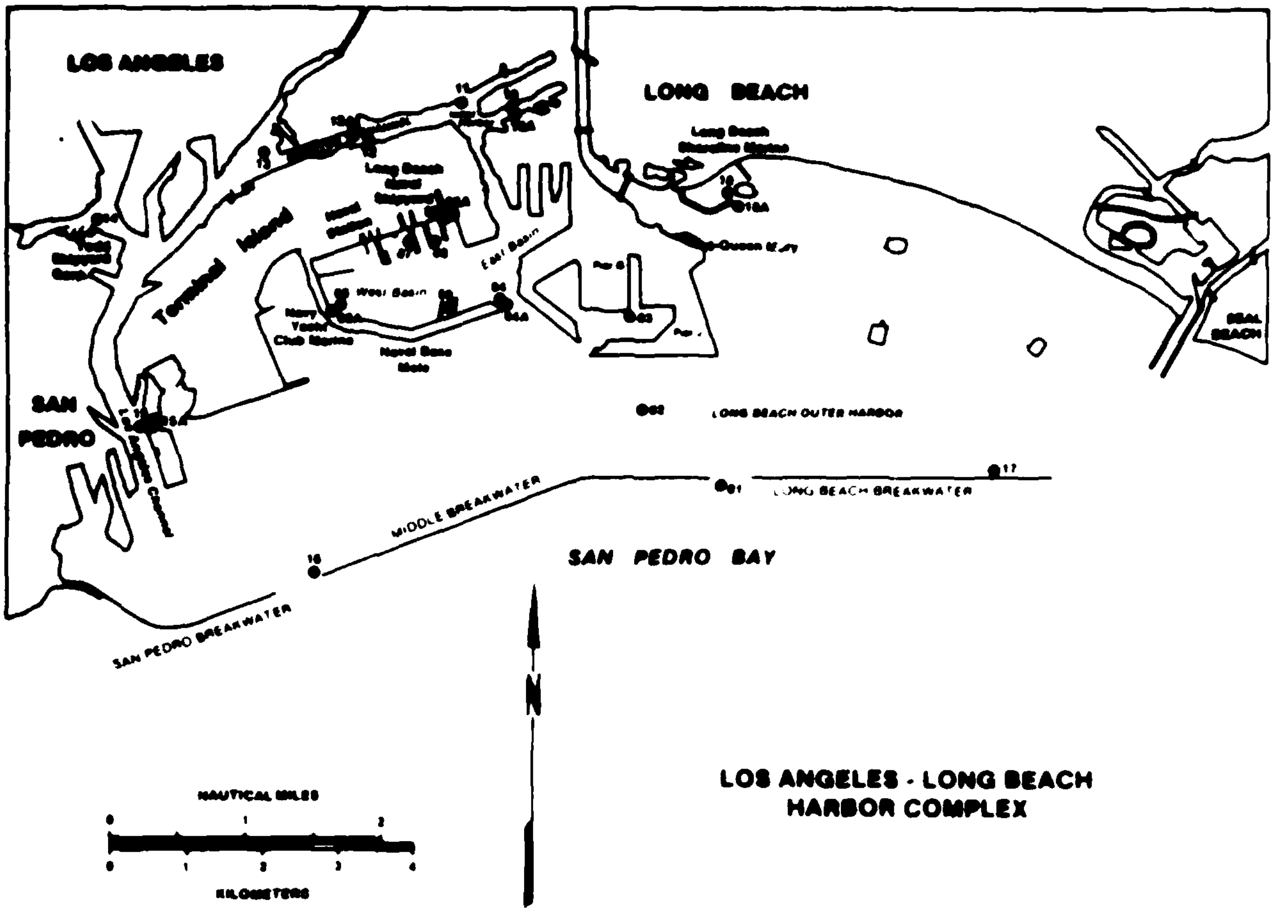


Figure 2. Sample station locations. Los Angeles/Long Beach Harbor Complex

Given its previous history of high levels of pollutants and stressed fauna (Martin, 1985), the Los Angeles/Long Beach harbor complex has made a remarkable recovery in marine environmental quality during the past decade. Areas sampled during the survey range in environmental status from good (outer harbor areas) to poor (Cerritos and Los Angeles Channels). The Long Beach Middle Harbor West Basin, inside the Naval Base Mole, represents an average position in water quality. A trend of decreasing diversity in benthic invertebrate populations is demonstrated from the outer harbor areas toward the inner harbor regions. Mussels were plentiful along most shoreline areas. Kelp beds are found along the middle and western sections of the outer harbor breakwater; these areas, primarily along the outer breakwaters, represent the most ecologically valuable regions in San Pedro Bay.

Twenty-two stations were established and sampled on 25 and 26 June 1985. These are described in appendix B, table B-2.

Water

Water samples were collected at 21 stations in the harbor complex in and around the Long Beach Naval Station on 25 and 26 June 1985. Data from these samples exhibit a wide range of values of organotin compound content. The highest values were recorded for the center of the Long Beach Shoreline Marina (station 18) with a mean of 0.108 μg/l of TBT. Dibutyltin and monobutyltin values at this location were also correspondingly high (see appendix C, table C-2(w)). TBT content of surface waters at the entrance was, however, too low to be reliably quantified. Water samples from the outer harbor area contained no detectable TBT. The Los Angeles and Long Beach Inner Harbors demonstrated relatively low TBT quantities within the range of 0.005 to 0.029 μg/l (see appendix A, figure A-4). All waters under Navy jurisdiction (i.e., West Basin) with the exception of station 8A (within the Navy Yacht club) contained no detectable or measurable TBT. The mean level of TBT at station 8A was recorded at 0.021 μg/l. Waters within Middle Harbor Southeast Basin (station 3) contained 0.012 μg/l TBT.

Sediment

Sediment samples in the Los Angeles/Long Beach harbor complex were collected from 18 stations (see appendix B, table B-2(s)). Data from the analysis of those samples are pending.

Tissues

Mytilus edulis collections consisting of five pooled tissue samples at each of seven stations (see appendix B, table B-2(t)) were made on 26 June 1985. Analysis of those samples is in progress.

SAN FRANCISCO BAY, CALIFORNIA

General

San Francisco Bay supports numerous maritime activities, both military and civilian, including the Port of San Francisco, the largest port on the bay and one of the most important on the west coast of the United States. Major Naval commands in the area, under the jurisdiction of Naval Base San Francisco, are Naval Air Station, Alameda; Naval Supply Center, Oakland; and Naval Station, Treasure Island. The Naval Support Activity at Mare Island is also under this jurisdiction, but is discussed in the following section. Alameda Naval Air Station is on a filled area on the west side of an island separated from the mainland by San Leandro Bay on the east and Oakland Inner Harbor and Tidal Canal on the north. The Naval Air Station berths are capable of accommodating large aircraft carriers. The inner lagoon contains a boathouse with facilities for numerous small craft. The Treasure Island Naval Station, located in the middle of the northern portion of San Francisco Bay, is capable of handling ships of frigate size or smaller, although new construction is projected to accommodate vessels in size up to battleships. A Coast Guard Base is located on Yerba Buena Island, immediately to the south of Treasure Island.

The Port of San Francisco includes many deepwater piers for handling general cargo, four large special-purpose terminals, and numerous smaller berths that are used for the receipt of fish products, oil, ship repairs, and other activities. The 3-mile-long northern shoreline of the city of San Francisco from the Golden Gate Bridge to the main waterfront of the Port of San Francisco includes Fisherman's Wharf and several yacht harbors with a total capacity of about 1,200 boats. The Port of Oakland is the largest general-cargo port on the bay as well as an important containership terminal on the west coast. The port is divided into three sections (figure 3). The Oakland Outer Harbor is situated to the north of the Naval Supply Center, Oakland. A major portion of the Middle Harbor is under the control of the Naval Supply Center. The Oakland Inner Harbor Channel extends to the east from the entrance of the Middle Harbor and is bordered by the city of Oakland to the north and Alameda to the south. The Emeryville Marina, which is located roughly 1 nautical mile north of the Outer Harbor, can accommodate about 300 small craft within its enclosed basin; there are many small-craft facilities along both sides of the Oakland Inner Harbor channel. Alameda maintains various facilities along the northern shoreline of the island directly opposite the Port of Oakland, including Encinal and Fortmann Basins, opposite Government Island, with shipbuilding and repair yards and floating dry docks.

The mean tidal range at Golden Gate is 4.1 feet (1.3 meters), with a maximum range of approximately 9 feet (2.7 meters). During flood tides, the currents set into all parts of the bay and cause swirls and eddies within the entrance to the bay and around the San Francisco-Oakland Bay Bridge foundation piers. Mud is the dominant bottom type in the shallower, eastern portion of the bay, except within dredged channels. The central and western parts of the bay have bottoms composed of mud, sand, and shell debris, while hard, rocky patches occur occasionally along the western shoreline.

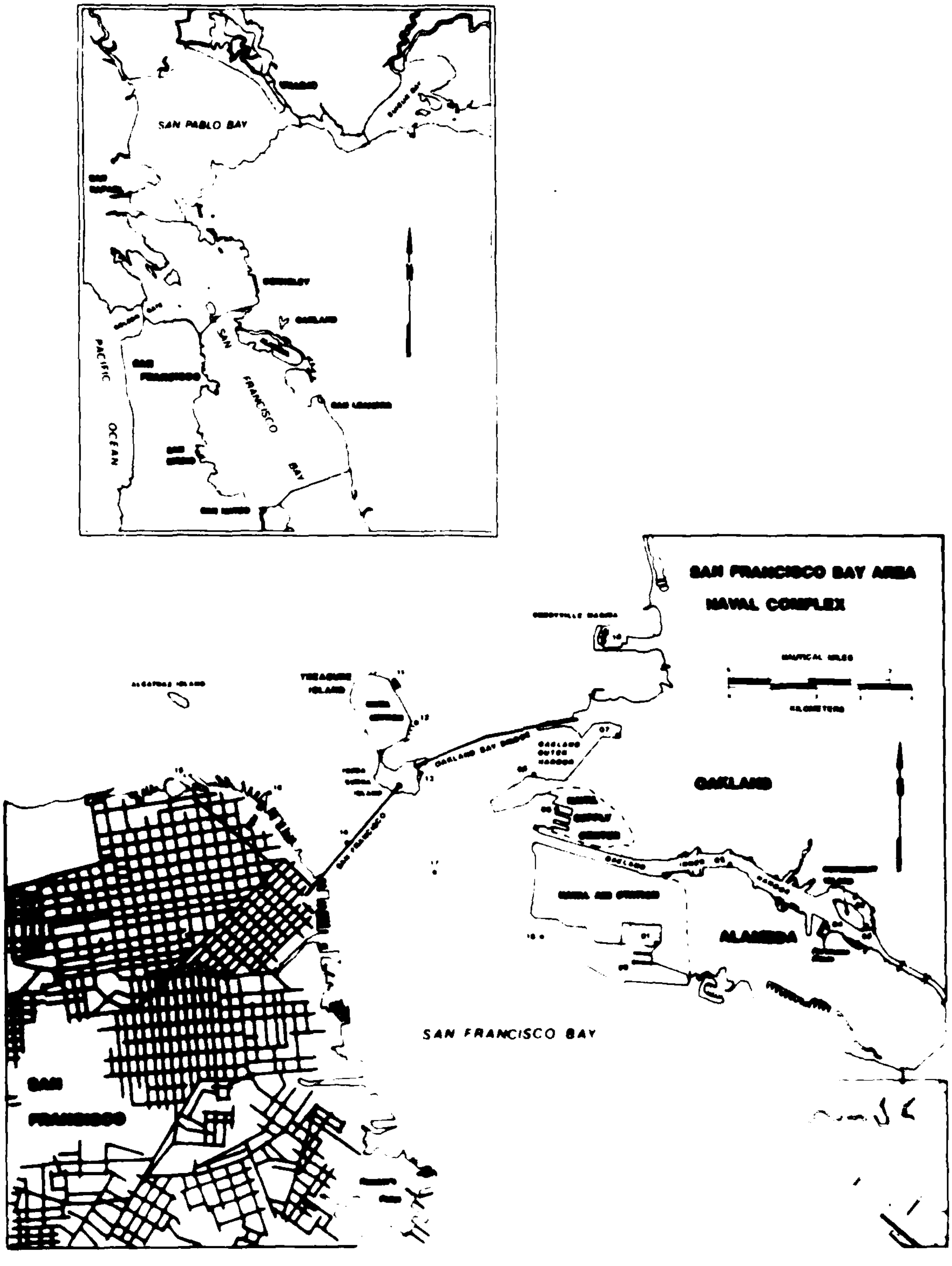


Figure 3 Sample station locations San Francisco Bay

Numerous species of fishes inhabit the bay area and several are of economic importance. Salmon, flatfish, and striped bass are the most important in terms of catch size; but anchovies, herring, smelt, and sardines are also found within the bay. Saltwater perch are a very prominent part of the saltwater resource inside the bay; however, bottom fishes such as rockfish are a limited recreational resource. Crustacean resources in San Francisco Bay are mainly focused around bay shrimp and Dungeness crabs. Commercial bivalve resources in the bay are limited and mainly concentrated in the south bay region, beyond the scope of the baseline survey effort.

From 19 to 20 February 1986, 18 stations were established and sampled in the north bay region. These sample stations are shown in figure 3. Sampling was complicated by the presence of a major storm system in the region that was accompanied by high winds and heavy rains.

Water

Water samples were collected at 18 stations during the baseline survey, and the surface water butyltin compound content data are summarized in appendix C, table C-3(w). TBT was undetectable at all stations outside of the Oakland Inner Harbor. The highest levels of TBT were detected in the waters adjacent to the Pacific Dry Dock and Repair facility located in the Brooklyn Basin North Channel, north of Government Island (station 2). The mean level of TBT at station 2 was established at 0.129 μg/l. The next highest readings were taken in the center of the Fortmann Basin Marina on the southern side of the Brooklyn Basin South Channel, south of Government Island, where the mean surface water TBT content was established at 0.028 μg/l. Two small Coast Guard facilities, one on the southern end of Government Island and the other in the Oakland Inner Harbor Channel, showed surface water levels of 0.012 and 0.010 μgTBT/l, respectively (see appendix A, figure A-5).

Sediment

Sediment samples were collected from stations 1 through 18 on 19 and 20 February 1986. Analysis of those samples is in progress.

Tissues

Samples of *Mytilus edulis* tissues were collected from four stations in San Francisco Bay on 19 and 20 February 1986 (see appendix B, table B-3(t)). Analysis of those samples is in progress.

MARE ISLAND STRAIT (NAPA RIVER), CALIFORNIA

General

Mare Island Strait is the main connecting link between the Napa River and Carquinez Strait, which connects Suisun Bay to San Pablo Bay (see inset, figure 3). The city of Vallejo is situated on the eastern shore and Mare Island is located on the western side (figure 4). Major Navy commands on Mare Island are the Naval Support Activity and Naval Shipyard. The Naval Weapons Station, Concord, also maintains an annex on Mare Island. Navy fleet units present along the western shore include submarines, several surface auxiliary vessels, units of Special Boat Unit 11, and barges. Two civilian marinas are present along the eastern shore, including the Vallejo Marina with a capacity of about 400 boats; each of these marinas was sampled. Barges and pleasure craft make up most of the traffic on the Napa River above the Naval Shipyard.

Water quality conditions in Mare island Strait are generally good, although they can change with seasons and depth. Dissolved oxygen concentrations are usually high (low dissolved oxygen levels have been reported in the channel bottom), and water temperatures ordinarily range from 10 to 15°C. Salinities within the strait vary with the amount of freshwater input from the Napa River and generally range from 2 parts per thousand to 15 parts per thousand. Current velocities are correlated with tidal flux with a mean maximum velocity of 1.8 knots. Mean tidal range is from 4 to 5 feet (1.2 to 1.5 meters), and depths in the channel areas may attain 37 feet (11.3 meters). Temperature and salinity data collected during the baseline survey using a Beckman portable salinometer (Model RS5-3) from selected stations in Mare Island Strait ranged from 14.5 to 15.9°C and 7.8 to 14.3 parts per thousand, respectively. These values correspond with previously reported data (US Army Corps of Engineers, 1981).

Areas of special environmental significance in the region include critical anadromous fish migration routes (US Army Corps of Engineers, 1981), salt marsh habitat north of Mare Island, and commercial and recreational fishing in the lower Napa River (primarily for striped bass and white sturgeon). The steelhead trout and striped bass fisheries based around the Napa River system are of considerable economic importance in the San Francisco Bay region. The distribution and abundance of benthic fauna is influenced by the high-energy hydrodynamic characteristics, unstable substrate conditions, low salinities, and the required periodic dredging of the channel. Mare Island Strait is apparently devoid of shellfish resources.

Eighteen primary sampling stations were visited during a baseline survey performed 16 to 18 April 1984. The stations sampled covered the region from the Napa River entrance at Carquinez Strait north to the Napa River Bridge. Sampling station locations for Mare Island Strait are shown in figure 4.

Water

Baseline water column data demonstrate the near absence of detectable organotin compounds in Mare Island Strait water samples at 17 out of 18 sampling stations (appendix A, figure A-6). The only measurable organotin (0.04 μgTBT/l) in Mare Island Strait was found adjacent to the Vallejo Yacht Club (station 12). TBT was well replicated in three separate water samples from this station (see appendix C, table C-2(w)).

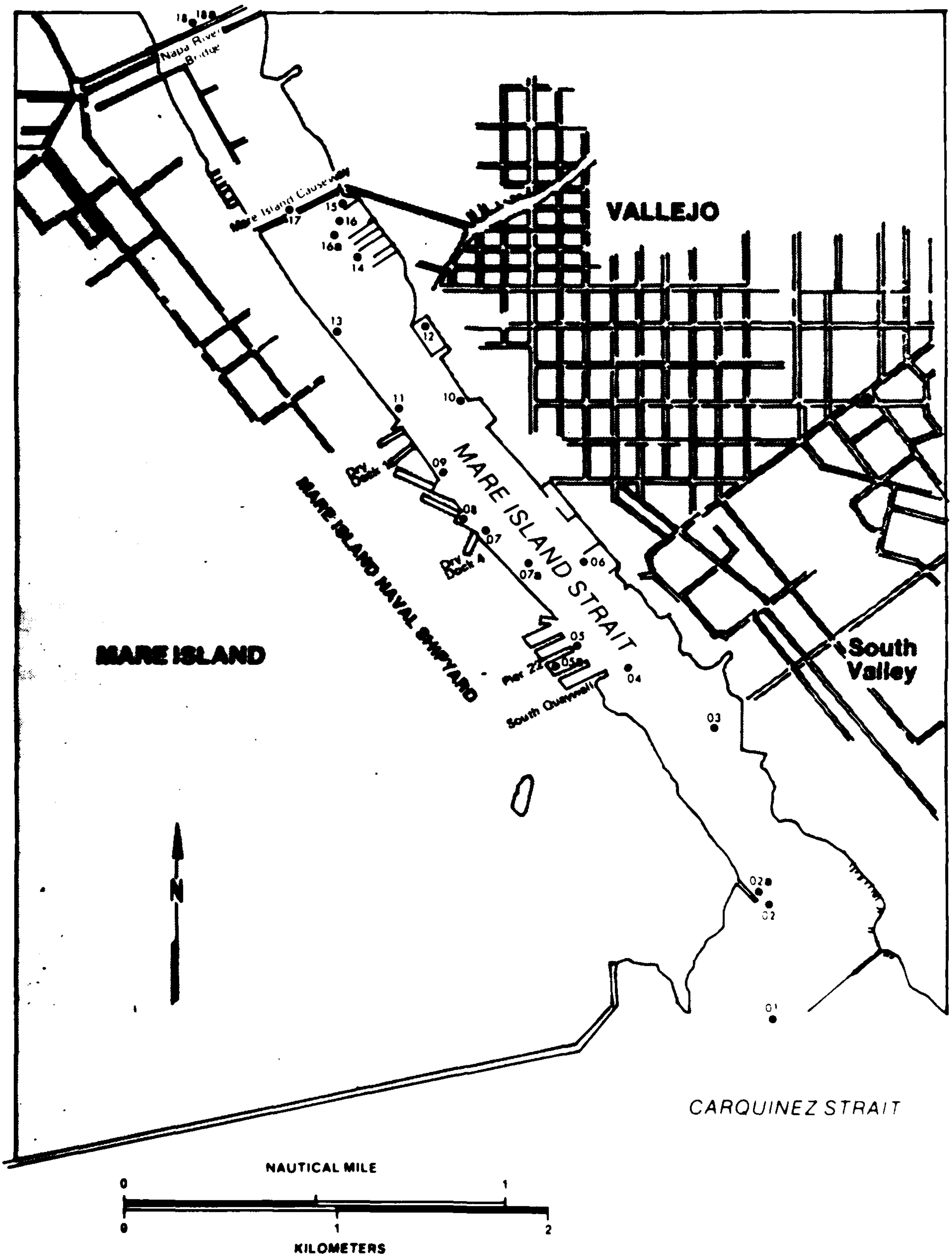


Figure 4. Sample station locations: Mare Island Strait.

Sediment

Sediment samples were collected at 18 stations in Mare Island Strait on 17 April 1984. The analysis of 34 sediment samples revealed very low background levels of solvent extractable organotins (see figure A-7, appendix A). A mean value of 4.2 ngSn/g in sediments was calculated for total extractable organotin in Mare Island Strait. Sediment data for Mare Island Strait are listed in appendix C, table C-2(s). The highest sediment organotin value, 15.75 ngSn/g, was measured at station 12 (adjacent to Vallejo Yacht Club) and the mean solvent extractable tin concentration for that station was at 8.53 ngSn/g.

Tissues

Tissue collections were not made during the Mare Island Strait organotin baseline survey because neither mussels nor oysters were available in the areas adjacent to sampling stations. A concerted effort was made to locate any bivalves attached to pilings or other vertical substrata in the Napa River or Mare Island Strait. Only a few barnacles were observed during these diving observations.

BREMERTON (SINCLAIR INLET), WASHINGTON

General

The Naval Shipyard at Bremerton occupies most of the northern shore of Sinclair Inlet, an arm of Puget Sound, west of Seattle (see figure 5). The shipyard contains numerous large dry docks and is adjacent to the Naval Supply Center. A large inactive ship facility comprising several large fleet units is present. The city of Bremerton adjoins the shipyard, and the town of Port Orchard is situated across the inlet along the southern shore. The Bremerton municipal sewage plant outfall is located in Sinclair Inlet to the west of the shipyard and the inactive ship facility. A float landing, ferry pier, and two marinas with berths for 500 or more vessels are located at Port Orchard. A boatyard west of Port Orchard contains three marine railways and a marina with a capacity of 50 vessels. A ferry terminal is located to the east of the naval shipyard in Bremerton.

The bottom topography is primarily grey mud and silt to a depth of 65 feet (19.8 meters). The average depth is typically 33 feet (10.1 meters). A large mudflat occupies the western end of the embayment, and a rock flat that is uncovered at low tide extends for several hundred meters from the shoreline east of the town of Port Orchard. Tidal currents in the area are generally very weak, depending on tidal state, although tidal currents of 2 to 3 knots are present in adjacent Puget Sound waters. Fresh water input is limited and varies with seasons. Stratification is negligible.

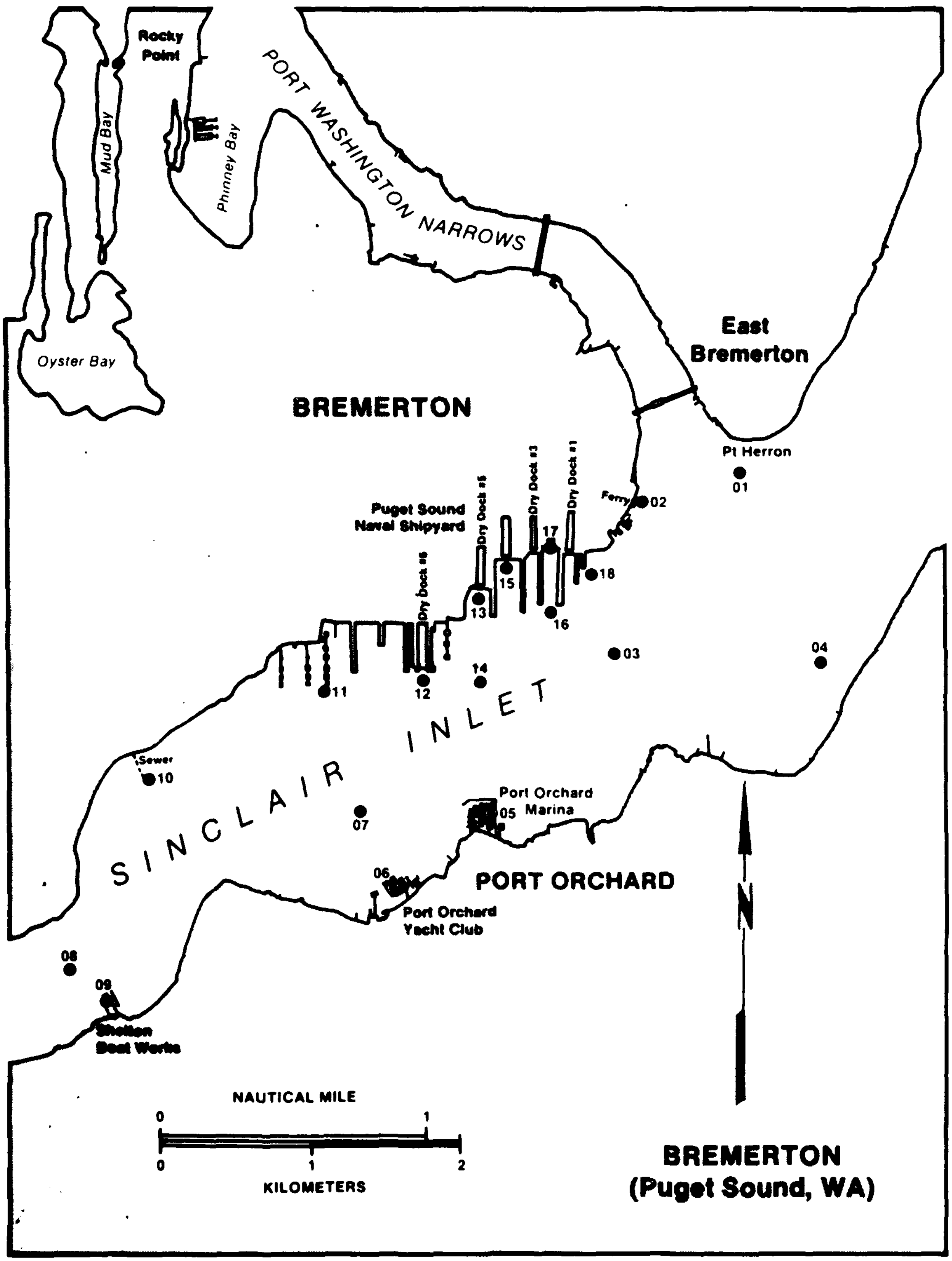


Figure 5. Sample station locations: Bremerton (Sinclair Inlet).

Puget Sound supports large and varied biological assemblages, and Sinclair Inlet contains many species of economically valuable fish and shellfish. Generally, water quality is good within Puget Sound; however, in Sinclair Inlet, some degradation exists in water and sediment quality, especially in the region adjacent to the Puget Sound Naval Shipyard. The inlet is closed to shellfish harvesting due to elevated coliform bacterial concentrations from inadequately treated sewage effluent pollution, which is most pronounced after heavy rainfall. A small bed of hardshell clams is located near Port Orchard. Many commercially and recreationally important fishes (and baitfishes) inhabit the inlet. Several species of salmon and other anadromous fishes use the tributaries of the inlet for spawning, although Sinclair Inlet is not considered a major Puget Sound migration pathway.

Eighteen stations were selected for sampling within Sinclair Inlet, covering the inlet from its entrance at the junction of the Port Washington Narrows and Rich Passage to the westernmost point possible. These stations were sampled on 14 and 15 June 1985. Sampling station locations for Sinclair Inlet are listed in appendix B, table B-5.

Water

Water column data analysis for the Bremerton area was complicated by matrix interferences during processing of samples from several stations. Samples from stations 4, 5, 9, 12, and 15 exhibited this interference, which rendered data analysis difficult. Only 3 of the remaining 13 stations displayed measurable organotin content (see appendix C, table C-5(w)). The ferry slip on the eastern shore of the city of Bremerton (station 2) exhibited a mean content less than 0.003 μgTBT/l. The Port Orchard Marina and the Port Orchard Yacht Club (stations 5 and 6) were the only other areas in which organotin was measurable, both exhibiting slightly elevated mean levels (0.007 and 0.017 μgTBT/l, respectively).

Sediment

Sediment samples were collected at 18 stations on 14 June 1985 (see appendix B, table B-5(s)). Analysis of those samples is in progress.

Tissues

Mytilus edulis samples were collected in Sinclair Inlet on 14 June 1985 from four stations (see appendix B, table B-5(t)). The stations were located off of Point Herron, at the entrance to Sinclair Inlet; at the Washington State Ferry System terminal at Bremerton; within the Port Orchard Marina; and at the entrance to dry dock 5 within the Puget Sound Naval Shipyard. Analysis of these samples is in progress.

PEARL HARBOR, HONOLULU HARBOR, AND KEWALO BASIN, OAHU, HAWAII

General

These three harbors are located on the southern shoreline of the island of Oahu, Hawaii. Pearl Harbor is under US Navy jurisdiction and is used primarily by Navy vessels of the Pacific Fleet. Major activities within the Pearl Harbor Naval Base include the Naval Station, Naval Shipyard, Naval Submarine Base, Shore Intermediate Maintainance Facility [SIMA], Naval Supply Center, Inactive Ship Facility, and one

small boat harbor, Rainbow Marina. The towns of Aiea, Pearl City, Waipahu, and Ewa Beach surround the harbor from the northeast to the west. Hickam Air Force Base and the Honolulu International Airport lie to the east of the entrance channel. Pearl harbor is subdivided into three major areas: East, Middle, and West Lochs. Southeast Loch and the immediately adjacent areas (see figure 6) encompass the greatest concentration of naval activities within the harbor. Civilian vessels visiting the harbor include occasional freighters and tankers at the Naval Supply Center piers (adjacent to station 13), daily commercial tour boats, and tuna fishing boats (to collect baitfish).

Honolulu Harbor is the primary commercial port for the State of Hawaii with over 60 piers and wharves around the harbor waterfront. Honolulu Harbor accommodates ship repair facilities (several floating dry docks), a sizable containership terminal, several University of Hawaii research vessel piers, and a Coast Guard Station (figure 7). Naval vessels are occasionally dry-docked at Dillingham or Unitec commercial floating dry docks in Honolulu Harbor. This harbor was selected for comparison with Pearl Harbor, primarily used by the Navy. Kewalo Basin is a small man-made harbor southeast of Honolulu Harbor. It is predominately used by commercial fishing and tour boats, recreational boats, and civilian research vessels that moor in the basin. The Hawaii Tuna Packer's cannery and ice plant are also in Honolulu Harbor.

The main entrance channel of Pearl Harbor is dredged to a project depth of 45 feet (13.7 meters), and the main basin has several areas deeper than 60 feet (18.3 meters). Tidal flow and circulation are weak and variable with a mean velocity of 0.1 knot and a maximum ebb flow of approximately one-half knot. Surface currents within Pearl Harbor are dependent upon prevailing conditions of wind, tide, and fresh water flow from streams. Freshwater inputs are irregular from several streams that drain storm water runoff into West, Middle, and East Lochs. Salinities in the harbor range from 18.1 to 40.0 parts per thousand and average about 32.8 parts per thousand. Dissolved oxygen levels are considerably variable and occasionally descend to zero in some areas.

The bottom consists primarily of grey or black mud and silt, with coral rubble, gravel, sand, and mud present along the sides of dredged channel areas. Siltation is primarily due to the runoff and deposition of terrigenous sediments following periods of sustained or torrential rainfall. Heavy metal concentrations in Pearl Harbor sediments are generally highest in Southeast Loch, the area of the greatest ship congregation. An extensive fringing reef habitat is located outside the entrance to the harbor; however, no living coral is present inside Pearl Harbor. The water quality of the harbor ranges from good to poor, depending upon proximate circumstances and the level of industrial/shipboard activity.

The 40-foot-deep (12.2 meters) entrance channel of Honolulu Harbor leads into the main harbor basin, which is maintained at 35 feet (10.7 meters). The harbor is usually free of surge and exhibits a mean tidal range of 1.2 feet (0.4 meters). Tidal currents are generally weak (velocity less than 1 knot) and set along the channel axes. Fresh water inputs are received from two major drainage canals, and flow of fresh water into the harbor is variable. The bottom is composed predominately of black or grey mud and silt, with rock and coral present at the fringes of the channel entrances.

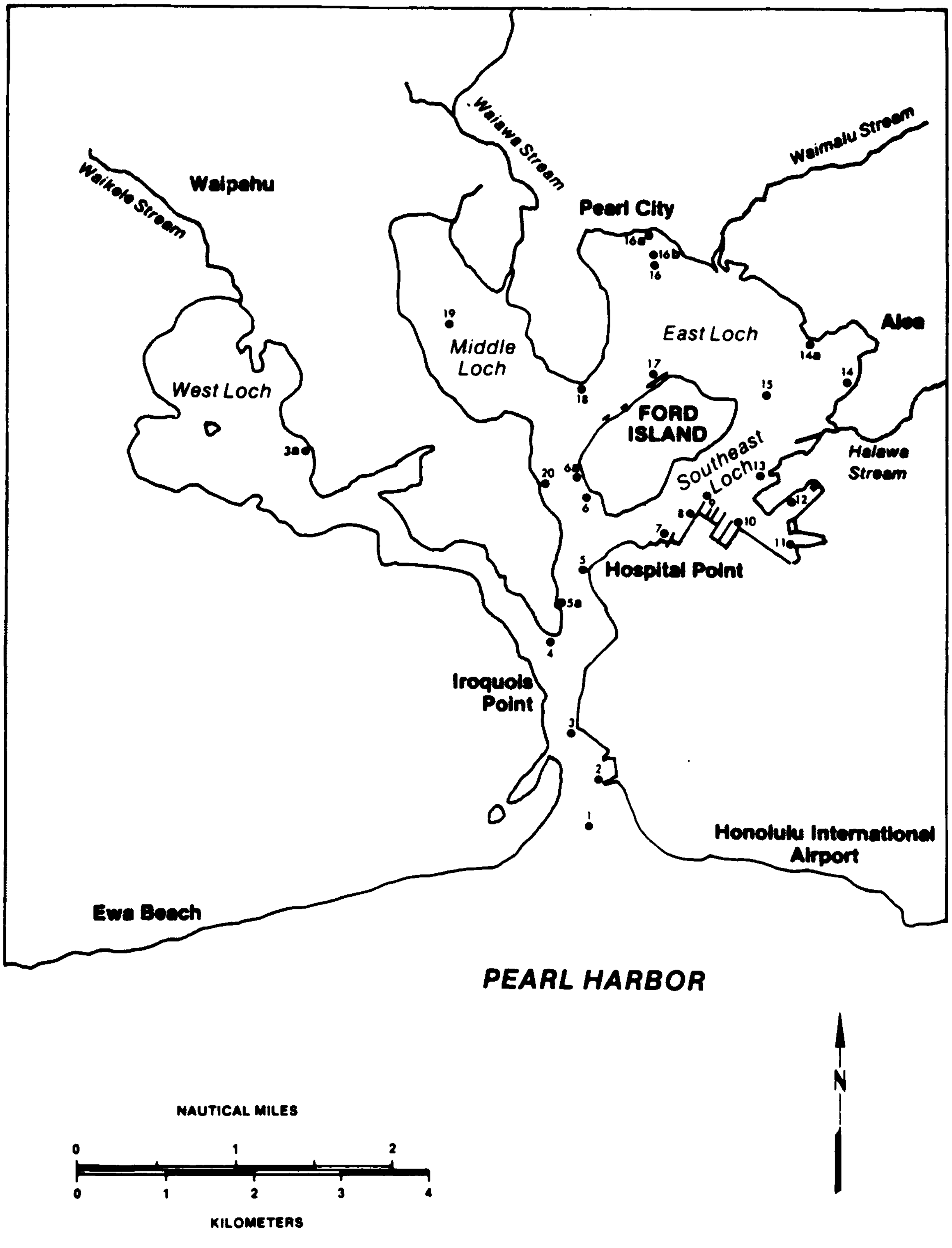


Figure 6. Sample station locations: Pearl Harbor.

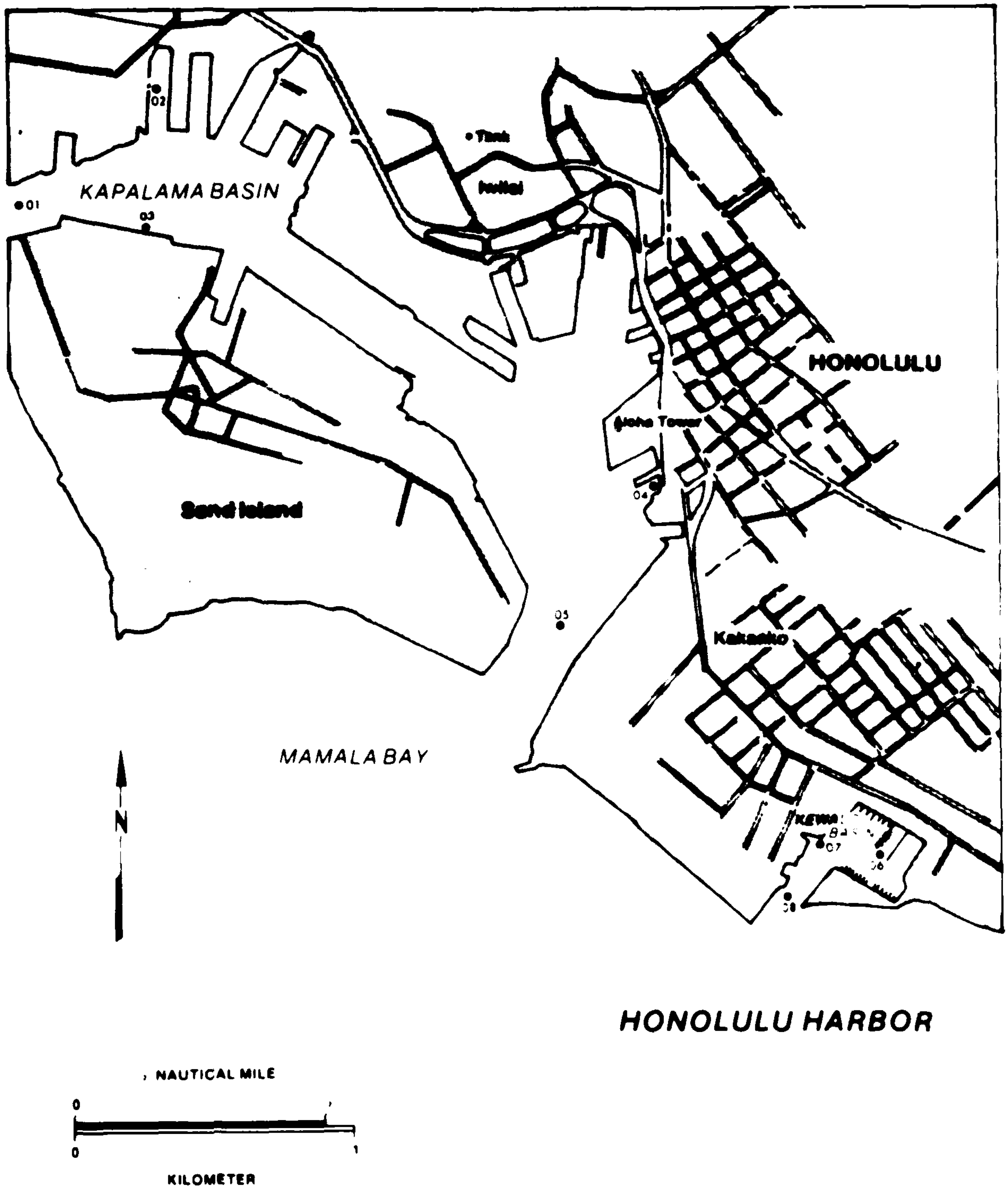


Figure 7. Sample station locations: Honolulu Harbor and Kewalo Basin

Substantial ecological resources exist in both Pearl Harbor and Honolulu Harbor. Pearl Harbor exhibits the characteristically high biological complexity and productivity of a low-energy, eutrophic estuarine system. Biological patchiness is demonstrated throughout different regions of the harbor. The most environmentally stressed biological communities are located in Southeast Loch, Middle Loch, and along those areas of the South Channel adjacent to the shipyard.[1] Biological communities within the Southeast Loch region generally consist of highly pollution-resistant organisms. Benthic invertebrate population diversity varies with depth and type of substrate. Several important nearshore species of fish inhabit Pearl Harbor and provide limited recreational fishing. The elevated nutrient loads in the harbor results in high concentrations of holoplankton, with occasional red tide dinoflagellate blooms, although larval fish populations are generally negligible (Grovhoug, 1979). Pearl Harbor sustains economically important bait fisheries (primarily based on the Hawaiian anchovy, *Stolephorus purpureus*) and estuarine feeding and nesting habitats, mainly in the West Loch area, for two endangered bird species.

While the Honolulu Harbor does not exhibit the same biological productivity and diversity as Pearl Harbor, various finfish species of recreational fishing significance use this high-nutrient harbor as a foraging territory and constitute the primary ecological resource. Recreational boating resources in Honolulu Harbor also support the environmental importance of this region. No significant environmental resources are present within Kewalo Basin.

A study to determine the significance pf TBT loading from commercial ship sources in Honolulu Harbor was conducted in July 1984. Data were collected on the movements of all commercial vessels with a displacement greater than 100 gross tons, except for interisland tugs and barages, for three sample months (April, August, and December) in 1983. This ships' stays in port during each of the 3 months were extracted from the Honolulu Harbormaster's Vessel Movement Logs. The average monthly stay was multiplied by the computed wetted hull area to obtain the mean-square-meter-days-per-month value (this rate, when combined with the TBT input rate, results in a mass-loading-per-month value).

A total of 163 vessels were examined to produced a mean monthly ship hull exposure of 523.542 square-meter-days. A few ships with long stays or frequent calls (e.g., Matson containerships) contributed the bulk of the hull exposure in Honolulu Harbor. Thirteen ships (8 percent of the total), with over 10,000 square-meter-days per month each, contributed 60 percent of the total hull exposure. The high levels of TBT detected in the water samples from the station adjacent to the Matson containership terminal suggests that the contribution directly from ship hulls will be at least as significant as the contribution from dry-dock discharges, and harbor mass-loading from ship hulls will be greatly affected by paint type (TBT release rate) and duration of port visits.

Twenty-five sampling stations were selected in Pearl Harbor from 27 March to 4 April 1984 (see appendix B, table B-6 for locations). Six stations in Honolulu Harbor and three stations in Kewalo Basin were selected on 5 April 1984. Locations of the these baseline stations can be found in appendix B, table B-7).

[1] Evans, E.C. III (ed) 1974). *Pearl Harbor Biological Survey.* (NUC Tech Note 1128) Naval Undersea Center: San Diego. Technical notes are working documents and are not distributed outside of NOSC. For further information, contact the author.

Water

Twenty water sampling stations were visited on 27 and 28 March 1984 during the baseline survey in Pearl Harbor. Tables C-3(w) and C-4(w) in appendix C contain analytical results for surface water samples from Pearl Harbor and Honolulu Harbor/Kewalo Basin, respectively. A useful comparison of organotin surface water data is available from these Hawaiian locations. Only two sites (at the entrance to Pearl Harbor, see figure 6) provided trace level amounts of organotin compounds (monobutyltin). These stations are near two major sewage treatment discharges, which may be the source for organotin (Brinckman, 1984). Two TBT AF paint test vessels, USS OUELLET (FF 1077) and USS OMAHA (SSN 692), were not in port during the baseline survey. The virtual absence of organotin compounds at 20 stations in Pearl Harbor, when compared with moderate amounts of TBT at 6 out of 8 stations in Honolulu Harbor and Kewalo Basin (see appendix A, figures A-9 and A-12), is noteworthy. These latter two harbors are locations of rather dense commercial shipping, commercial and recreational fishing, and excursion vessel berths.

Table B-4 in appendix B summarizes field data for Honolulu Harbor and Kewalo Basin sampling sites. Station 2 is the site of Dillingham floating dry-dock operations that regularly use organotin paints. Matson containerships, which moor adjacent to station 3, are known to be painted with organotin AF paints (Michael Sloan, Devoe Marine Coatings, personal communication, May 1984). Water circulation (generally counterclockwise, south entrance to north entrance in direction) is significantly greater in Honolulu Harbor than in Pearl Harbor. This is primarily attributable to physiographic differences: Honolulu Harbor has two entrance channels; whereas Pearl Harbor has a single entrance. Mean total butyltin measured in Pearl Harbor surface waters was 0.001 $\mu g/l$ as compared with Honolulu Harbor at 0.11 $\mu g/l$. These two harbors represent the highest (Honolulu Harbor) and second lowest (Pearl Harbor) butyltin levels in water data observed during baseline survey collections. The ratio of TBT to total butyltin in Honolulu Harbor was 92 percent. The present of high overall levels of TBT in Honolulu Harbor is probably attributable to commercial ship docking and repair facilities combined with low particulate loading in Honolulu Harbor waters. The US Coast Guard is also known to use an organotin AF hull coating (SPC) on four of its nine vessels (not including small boats) based in Honolulu Harbor.

Sediment

Sediment samples were collected at 20 stations in Pearl Harbor and at 8 stations in Honolulu Harbor and Kewalo Basin from 27 March to 5 April 1984. These data are listed in appendix C, tables C-6(s) and C-7(s), respectively. Station 12 which is adjacent to the Submarine Base's Pearl Harbor floating dry dock (AFDM), showed measurable tin levels (51 ngSn/g) in a single sediment sample (appendix A, figure A-10). A test submarine coated with organotin AF paint had been in this floating dry dock several months prior to baseline sampling. Only one other station (13) showed measurable tin levels. This location is used by commercial vessels visiting the Naval Supply Center. Some of these vessels have probably been coated with organotin AF paints. Additionally, foreign naval vessels, which are acknowledged to incorporate organotin AF coatings (Gerard Bohlander, NSRDC Annapolis, personal communication, October 1985), regularly frequent Pearl Harbor. Analyses for 20 Pearl Harbor sediment samples revealed a mean organic solvent extractable tin value of 3.36 ngSn/g; whereas a mean value of 144.75 ngSn/g was calculated for Honolulu Harbor and Kewalo Basin sediment samples. Coinciding with the observations discussed in the preceding water

section, higher tin levels occur in sediments at most stations in Honolulu Harbor (appendix A, figure A-13). Sediment measurements from Pearl Harbor and Honolulu Harbor represent the lowest and highest mean total organic solvent-extractable tin concentration values, respectively, observed to date.

Tissues

Oysters (both *Crassostrea virginica* and *Ostrea* sp.) were collected from five stations in Pearl Harbor and one station in Honolulu Harbor from 29 March to 5 April 1984 (see appendix B, tables B-6 and 7 for sample site locations). Analytical results demonstrate a distinct difference in organotin tissue loading between these two locations. The mean tissue organic solvent extractable tin concentration from Pearl Harbor for five stations was 0.30 μgSn/g dry weight (0.05 μgSn/g wet weight); whereas Honolulu Harbor exhibited a mean tissue burden of 7.35 μgSn/g dry weight (1.18 μgSn/g wet weight). Levels of total organic solvent extractable organotin in Pearl Harbor and Honolulu Harbor samples are recorded in appendix C, tables C-6(t) and C-7(t) and illustrated in appendix A, figures A-11 and A-14.

MAYPORT BASIN/ST. JOHN'S RIVER, FLORIDA

General

Mayport Naval Station is located on the southern bank of the St. John's River, about 1-1/2 miles west from its entrance on the Atlantic Ocean coast of northern Florida. Mayport Basin (Ribault Bay) is a small, man-made embayment approximately 650 by 750 meters in size with a 1,350-meter-long entrance channel to the St. John's River entrance channel (figure 8). Mayport Basin is wholly under US Navy jurisdiction. Fourteen major ship berths are situated along the perimeter of the basin. SIMA, Naval Station, and Naval Air Facility are the major commands in the area. Mayport Naval Station is the third largest Naval facility on the eastern coast of the United States. By 1990, about 40 vessels, including aircraft carriers, cruisers, frigates, destroyers, minesweepers, and auxiliaries, are planned for homeporting in Mayport. One TBT AF paint test ship, USS SAMPSON (DDG 10) is stationed in Mayport. Because of its compact layout and direct access to the ocean, Mayport is of both economic and strategic importance.

The deep-water port of Jacksonville is the largest on the eastern coast of Florida. Most of the commercial marine terminals of the Port of Jacksonville are situated along the western bank of the St. John's River, approximately 21 nautical miles (38.4 kilometers) upriver from the entrance. The closest commercial shipyard to Mayport Basin is located about 6 nautical miles up the St. John's River. Commercial shrimp boats and fishing vessels are berthed at several wharfs along the waterfront of the town of Mayport, on the southern bank of the St. John's River, 3 nautical miles (5.6 kilometers) from the entrance. A Coast Guard Base is located at the southern end of the waterfront. Two small boat basins and a ferry terminal are situated between the Mayport waterfront and Mayport Basin.

Extensive wetlands, creeks, islets and the Intracoastal Waterway are situated to the west and north of the Naval Station. Depths in St. John's River and basin range to 45 feet (13.7 meters). Bottom types consist of mud and silt in the basin and sand with shell debris in the river entrance channel. The mean tidal range to the St. John's River is 4.9 feet (1.5 meters) at the entrance, and currents in the river range

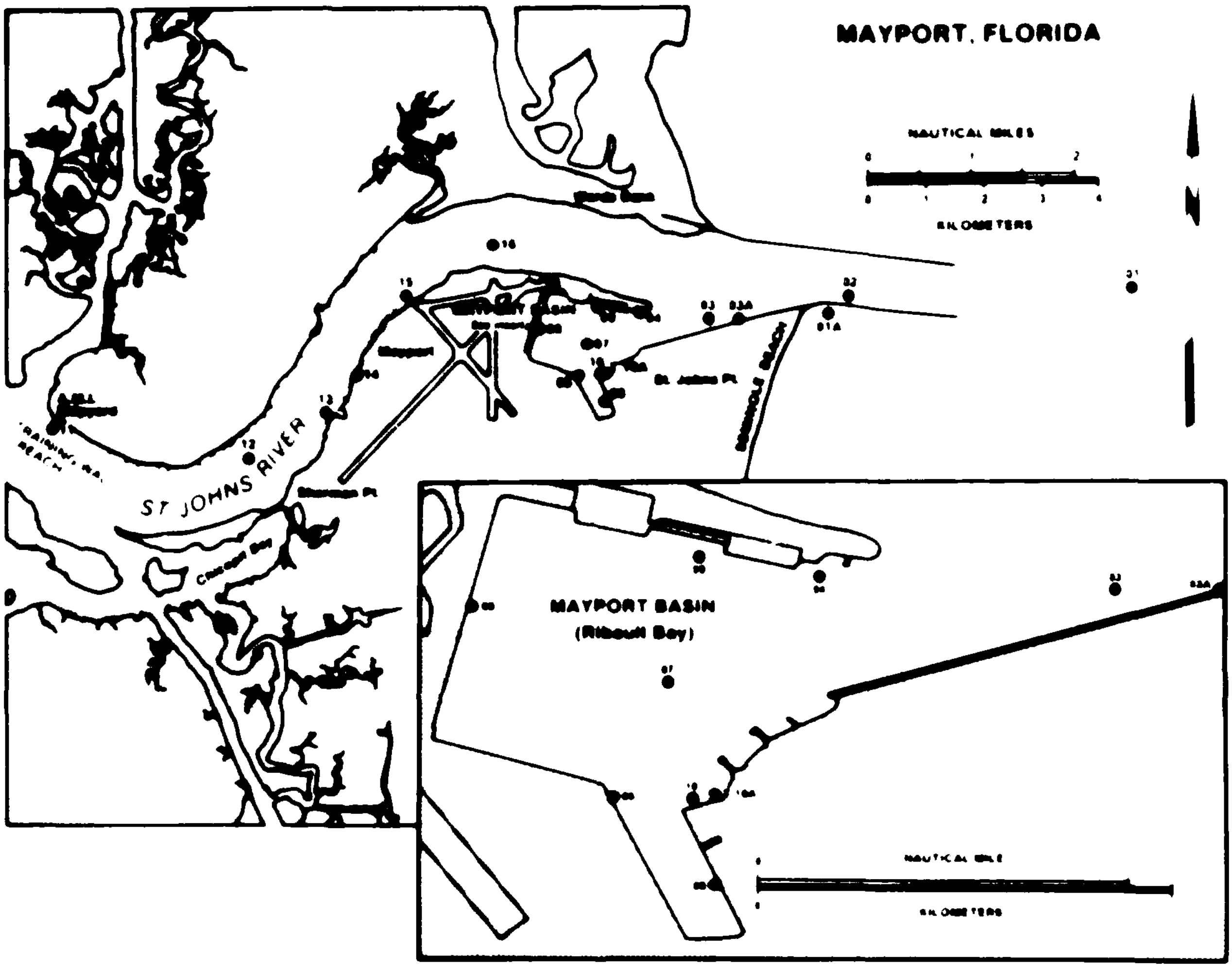


Figure 8 Sample station locations Mayport

from 1.9 to 2.3 knots at Mayport. Storm surges are most common during September and October and may generate tides up to 12 feet (3.7 meters) above mean sea level. Water and sediment quality conditions are generally excellent in the river, with dissolved oxygen levels typically close to saturation. Slightly poorer conditions prevail in the bottom areas of Mayport Basin. Oysters and other shellfish are harvested both recreationally and commercially, although high coliform bacterial counts have caused periodic closure of some areas. A relatively high rate of tidal flushing exists in Mayport Basin, though the basin receives inconsequential fresh water input other than rainwater runoff.

The lower St. John's River region supports an ecologically important habitat for many aquatic species. Blue crabs and oysters are abundant in the region. Juvenile shrimp are of particular significance in the area and provide for an important commercial shrimp fishery along the Atlantic coast. The extensive wetlands sustain a diverse assemblage of aquatic and terrestrial fish and wildlife communities. These wetlands also contribute support for food chains extending into the Atlantic Ocean. Various species of fish have been observed in the St. John's River estuary, including many of economic and sportfishing value. Some pelagic species of fish, including tarpon and jacks, frequent the lower regions of the estuary, and several anadromous species such as shad employ the river as a spawning migration pathway. Many fish havens are established outside of the mouth of the St. John's River. Twelve endangered species are known to inhabit the lower river basin, including five species of sea turtles, the American alligator, and the West Indian manatee.

Nineteen stations were sampled on 19 and 20 June 1985. The station locations are described in appendix B, table B-8.

Water

Water samples were collected from 16 stations in Mayport Basin and along the St. John's River (appendix A, figure A 15). The levels of organotin compounds in the water column samples were determined to be undetectable or too low to be measurable in most of the samples (appendix C, table C 8(w)). The mean TBT level of surface waters at the mouth of the St. John's River (station 1) was established at 0.013 µg l. Matrix interference during analysis prevented the determination of levels of TBT at station 15.

Sediment

Sediment samples were collected on 19 and 20 June 1985 from stations 1 through 16, inclusive (appendix B, table B 8(s)). Analysis of those samples is in progress.

Tissues

Tissue collections were made on 19 and 20 June 1985 for comparison with the data gained from the oyster tissues. The collections consisted of five pooled tissue samples of the oyster, *Crassostrea virginica*, from each of six stations (appendix B, table B 8(t)), and five pooled tissue samples of the ribbed mussel, *Guekensia demissa*, from station 10M (station 10A in figure 8). Data from the analysis of these samples are pending.

CHARLESTON HARBOR COMPLEX, SOUTH CAROLINA

General

The Charleston Naval Facilities Complex is located on the Cooper River about 6 miles (10 km) above Charleston Harbor (at Fort Sumter). The harbor is formed by the confluence of the Ashley, Cooper, and Wando Rivers (figure 9). Charleston Harbor is one of the finest on the Atlantic coast and a major economic port in South Carolina, serving commercial and military navigation requirements. All significant commercial and Navy terminal facilities are along the west bank of the Cooper River and the east bank of the Ashley River. Charleston is a primary homeport for 61 commissioned ships (including mine warfare vessels, destroyers, cruisers, frigates, submarines, and tenders), 20 service craft, and 12 small boats. Major naval commands consist of a Naval Base, Naval Station, Naval Shipyard, Naval Supply Center, Naval Weapons Station, Submarine Group and two Squadrons, Cruiser-Destroyer Group, four Destroyer Squadrons, Mine Warfare Command and Training Center, and a Submarine Training Center. The movement of naval vessels amounts to about one-quarter of the ship traffic in the Charleston area.

The Cooper River is the principal tributary of Charleston Harbor with a waterfront extending approximately 7 nautical miles (13 kilometers). The principal wharfs of the port are along the west bank of the Cooper River, with additional facilities available at Town Creek, and along the east bank of the Wando River and the Ashley River waterfront. A municipal marina is located in the Ashley River. Another yacht harbor is located near the entrance to the harbor along the Intracoastal Waterway and includes a sizable boatbuilding yard. The Charleston Coast Guard Base is situated along the waterfront at the entrance to the Ashley River.

Charleston Harbor is a midsalinity estuary with large inputs of fresh water. The mean tidal range is approximately 5 feet (1.5 meters), although storm conditions may increase tides by 2 to 3 feet (0.6 to 0.9 meters). The tidal currents at the entrance to the harbor range from 1.2 to 2.8 knots. The main channel of Charleston Harbor is maintained at 35 feet (10.7 meters). Water quality is generally fair, although dissolved oxygen level fluctuations are common, as is typical of estuarine systems of high productivity. Pollution from various point sources contributing to decreased dissolved oxygen concentrations and elevated coliform bacterial counts have recently been controlled somewhat.

A major sedimentation problem exists in the Cooper River with frequent shoaling in the channel and docking areas. This shoaling is caused by an increased flow of fresh water from upriver diversion projects into the harbor that interacts with tidal inflow of oceanic (saline) bottom water to form strong density currents. These currents trap sediments and create vast shoals requiring frequent dredging. A planned rediversion project should reduce the average flow of the Cooper River and, thereby, minimize shoaling problems in the near future. Furthermore, this rediversion should shift the Charleston estuary from a salt wedge (stratified) to a vertically mixed estuary, which is predicted to enhance the seaward transport of bottom sediments. This will also reduce flushing times.

Aquatic and wetland habitats in the Charleston area are extensive and provide important nursery and feeding grounds for many commercially and recreationally important fish and shellfish species. The lower Cooper River estuary, which includes

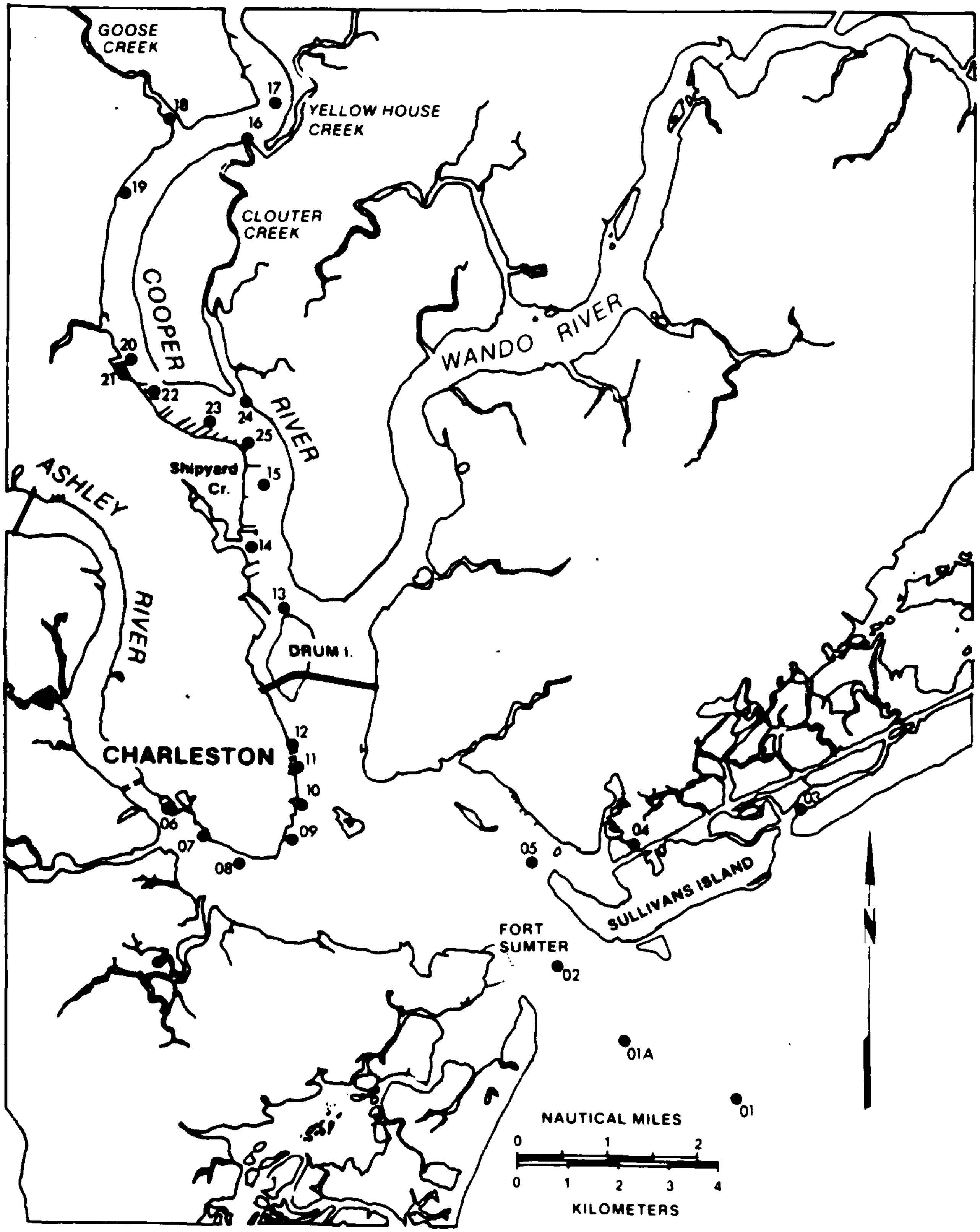


Figure 9. Sample station locations: Charleston

the Naval Activities Complex and Charleston Harbor, is not open to shellfishing or water recreation activities due to high bacterial levels. More than 100 species of fish have been identified from the Cooper River, and anadromous fishes such as striped bass and shad use the estuary as a migratory pathway (Wenner et al., 1984). Fishing, a major industry in the region, is based on shrimp, seed oysters, crabs, and various fish. Nine threatened wildlife species inhabit the Charleston area.

Baseline stations selected in the Charleston area are described in appendix B, table B-9. Twenty-six sites were sampled on 14 and 15 November 1984.

Water

Water column data exhibit near-total absence of ascertainable organotins in the Cooper and Ashley Rivers estuary samples in all but two stations (appendix A, figure A-16). TBT level in the Charleston Municipal Marina was established by well-replicated samples at a mean of 0.009 μg/l. The highest level of organotin compounds was exhibited at the entrance to Shipyard Creek at the lower reach of the Cooper River, with a water column TBT content of 0.031 μg/l.

Sediment

Sediment samples in the Charleston Harbor area were collected from 26 stations on 14 and 15 November 1984. Analysis of these samples is in progress at this time.

Tissue:

Tissue collections were made from eight locations in the Charleston Harbor area on 15 November 1984. These consisted of two to eight individuals of *Crassostrea virginica* per sample (see appendix B, table B-9(t)). Analysis of these samples is in progress at this time.

NORFOLK HARBOR COMPLEX (HAMPTON ROADS, ELIZABETH, AND JAMES RIVERS), VIRGINIA

General

The Norfolk Naval Complex baseline survey region includes the waterways adjacent to Newport News, Hampton Roads west of Fort Wool up to the James River Bridge, Norfolk Naval Air Station (including Willoughby Bay), Norfolk Naval Station (from Sewells Point south to grain elevators north of Tanner Point), Craney Island Disposal Area, the mouth of the James River, and extends up the Southern Branch of the Elizabeth River past the Norfolk Naval Shipyard at Portsmouth and up the Eastern Branch of the Elizabeth River (figures 10 and 11). Hampton Roads, the confluence of the James River estuary and the Elizabeth, Nansemond, and Lafayette Rivers, is the center of the largest concentration of military and civilian shipping activities on the East Coast of the United States, with over 30 nautical miles (54.9 kilometers) of improved waterfront facilities, and is the principal operational home port for the Atlantic Fleet. Presently, 80 commissioned surface vessels, 22 submarines, and 23 service craft are homeported in Norfolk. The Norfolk Naval Base Complex also provides logistic support for the Mediterranean Fleet. Major Naval commands in the region include the Naval Base, Naval Station, Naval Air Station, Naval Surface Weapons Center, Naval Shipyard, Naval Supply Center, Atlantic Reserve Fleet, and Naval Weapons Station Annex.

Norfolk Harbor encompasses both shores of the Elizabeth River and its Eastern, Southern, and Western Branches and a portion of the southeastern coast of Hampton Roads. The harbor, surrounded by the cities of Norfolk, Chesapeake, and Portsmouth, extends from Sewells Point 15 miles (27.6 kilometers) up the Southern Branch of the Elizabeth River. The facilities located along the eastern bank of the Southern Branch of the Elizabeth River are mostly commercial shipyards, oil terminals, and bulk-cargo piers, while the western shore is mainly occupied by Government installations. The confluence of the Southern and Eastern Branches of the Elizabeth River is the region of greatest small-craft concentration, with marinas located along both the Portsmouth and Norfolk shorelines. The port facilities of Newport News extend for over 2.5 nautical miles (4.6 kilometers) from Newport News Point up the northern shoreline of the lower James River and include the facilities of the Newport News Shipbuilding and Dry Dock Company, which extend for over 2 miles (3.7 kilometers) along the James River. Several recreational and commercial fishing vessel facilities are maintained at Newport News Creek and in the Hampton River.

The Elizabeth River has historically exhibited poor water quality; however, several commercially important fish species use the upper reaches for overwintering and as spawning and nursery grounds. The Southern Branch of the Elizabeth River is a highly polluted system and has a low likelihood of recovery in the near future in terms of environmental quality (Virginia Institute of Marine Science, 1974). Sediments in the Elizabeth River are heavily contaminated with heavy metals, oils, grease, and pesticides. However, as part of the general program to reduce pollution in the Chesapeake Bay, there is movement toward significant reduction in added pollutants to all the tributaries flowing into the region. Periodic blooms of dinoflagellates (red tide) occur throughout the Hampton Roads region.

Although water circulation patterns are not yet completely understood, a proposal has been made that during flood tides a counterclockwise current pattern exists in Hampton Roads that would tend to conserve larvae produced in the James River and create a water mass convergence zone off of Newport News (Haven & Fritz, 1985). Recent dye studies (R. Byrne, Institute of Marine Sciences, personal communication, October 1985) suggest that the water mass at this convergence zone submerges and travels upriver to many of the spat bed areas. The mean tidal range within Hampton Roads is 2.5 feet (0.75 meters), with currents in the roadstead being set with the tide with an average velocity of 1.5 knots, although winds greatly influence the direction and velocity. Current speeds in the Elizabeth River are largely determined by tidal flux; the average maximum velocity of currents in the Elizabeth River and its three branches is about 0.75 knots. Water temperature data collected during this baseline survey ranged from a maximum of 23.7°C on the surface to 14.1°C on the bottom. Salinity readings acquired during the survey ranged from 10.7 to 25.5 parts per thousand from surface to bottom, respectively, in the Elizabeth River.

The Hampton Roads region is heavily used by commercial shipping. Significant environmental resources present in Hampton Roads include large populations of shellfish, spawning areas, and nursery grounds in the lower James River. The area is an important nursery ground for several commercially important species of fish (including Atlantic menhaden, striped bass, and flounder) and is also an important feeding ground for bluefish, croaker, and numerous other species. The migratory components of various anadromous fish populations, including striped bass, herring, alewife, and American shad, also use the lower James River area as a migration pathway. Benthic diversity is high throughout most of Hampton Roads, although invertebrate populations

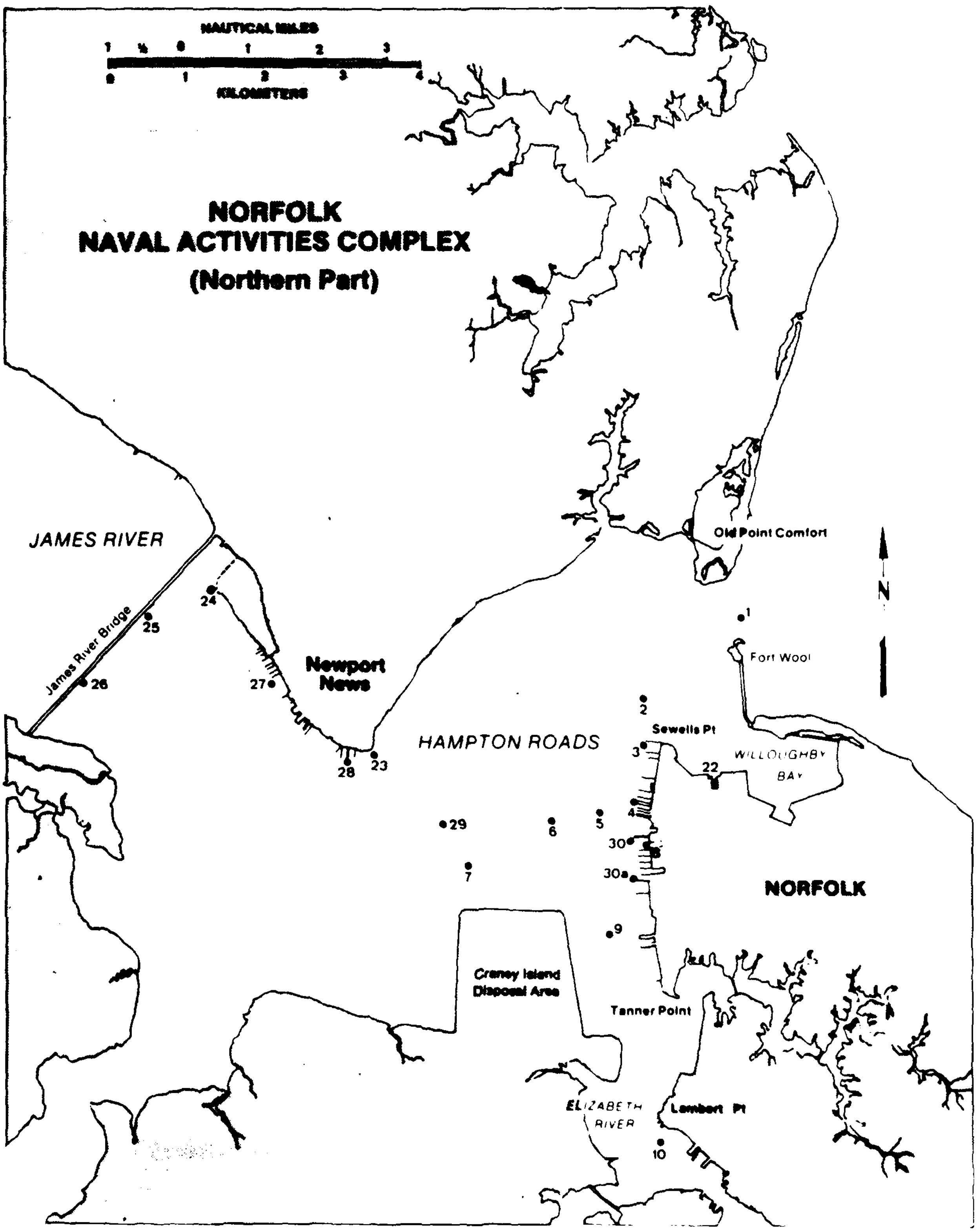


Figure 10. Sample station locations: Norfolk Naval Complex (northern part).

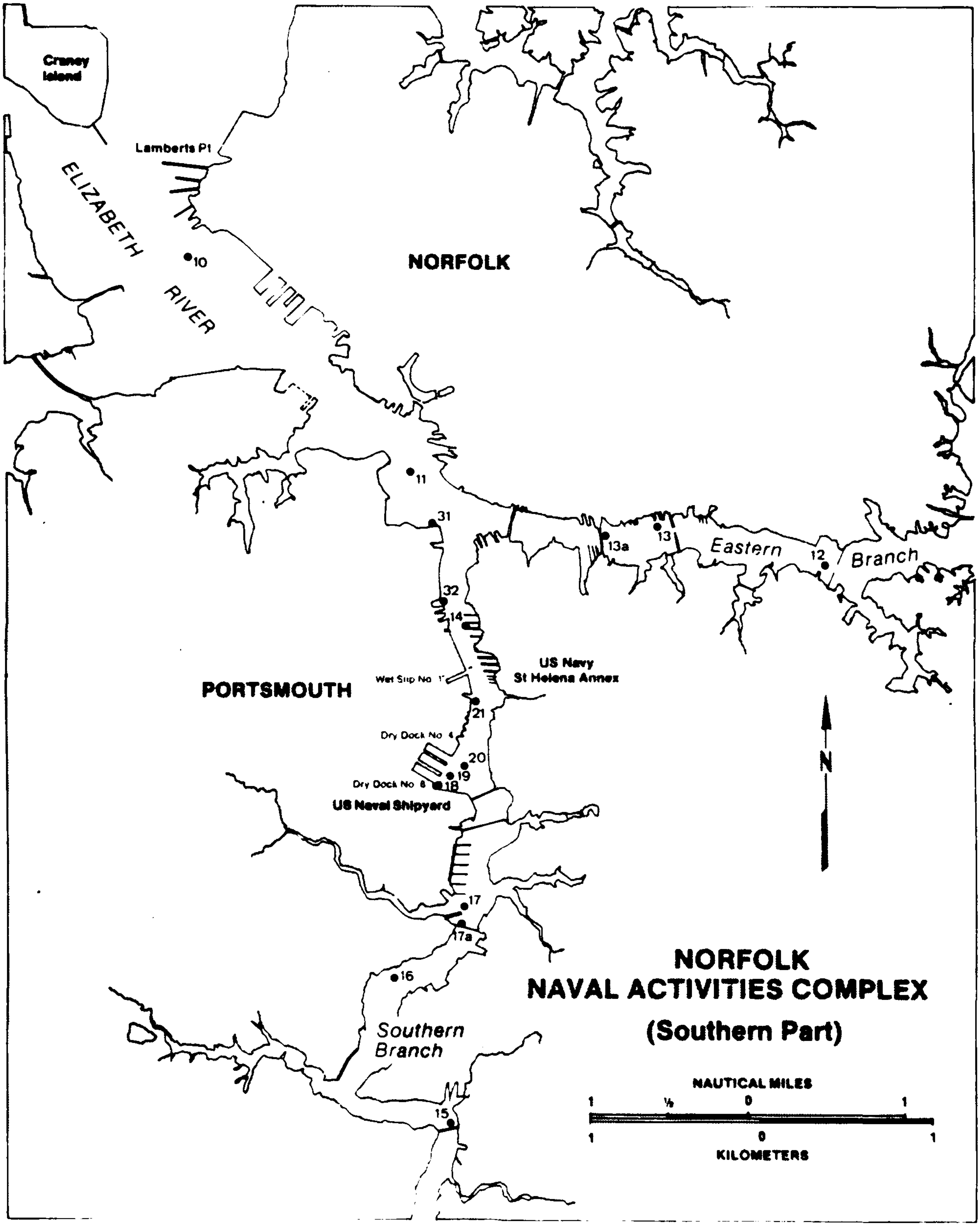


Figure 11. Sample station locations: Norfolk Naval Complex (southern part).

in the Southern Branch of the Elizabeth River consist mainly of characteristic assemblages of pollutant-resistant species.

As much as 75 percent of the seed oysters for the Chesapeake Bay oyster industry come from the lower James River (Haven & Whitcomb, 1983). This important resource requires careful monitoring to ensure organotin compounds do not adversely affect the spat grounds. Since the 1950s, there has been a marked decrease in the oyster populations within Chesapeake Bay. This decline has been attributed to a complex series of events including the effects of the pathogen, *Minchinia nelsoni* (MSX), and other diseases, socioeconomic impacts, and pollutants such as creosote, chlorine, and kepone (Haven et al., 1978). In addition to the reductions in overall oyster populations, extreme variations in spatfalls have been noted over the last 30 years (Haven & Fritz, 1985), demonstrating the fragile and variable nature of this important resource.

Baseline field survey samples were collected from 32 primary stations from 24 to 30 May 1984. For reporting convenience and clarity, sampling stations for this region are shown in two figures: northern and southern parts (figures 10 and 11).

Water

Measurable levels of organotin were present in 30 percent of the water samples collected in the Norfolk Naval Complex and adjacent areas (appendix A, figures A-17 and A-18). The Norfolk and Hampton Roads region (northern part, figure A-17, appendix A) showed moderate amounts of organotin in the water column samples at only two sites: station 7 (0.06 μgTBT/l, which is within 20 meters of three semipermanently moored merchant tankers coated with organotin (SPC-4 and Takata) and station 22 (12 μg/l) at the Norfolk Naval Air Station Marina in Willoughby Bay, where about 75 recreational vessels are moored. Appendix C, table C-10(w) lists water data for the Norfolk Naval Complex.

In the Elizabeth River, four stations (11, 15, 17, and 31) showed low levels of TBT ranging from 0.010-0.044 μg/l. Three stations (14, 21, and 32) exhibited TBT levels ranging from 0.048-0.110 μg/l. Stations 12, 13, and 16 showed trace (not measurable) levels of TBT. A three-station OTHBS range (stations 18, 19, and 20) was established adjacent to the USS CORAL SEA (CV 43) at the time of sampling. This ship was painted with International Paint's SPC-200 Series (HiSol) in March 1984 (G. Bohlander, DTNSRDC, personal communication, April 1984) as a test ship in the AF paint program. An interesting pattern was seen in the tributyltin-to-total-butyltin ratio with increasing distance from the CORAL SEA (70-, 67-, and 38-percent TBT, respectively). This appears to indicate that source regions can be detected by the ratio of TBT to its degradation products.

Sediment

Ninety-six sediment samples (from 32 sampling stations) were collected on 24 and 25 May 1984 from the Norfolk area. The analytical results for 50 of these samples are summarized in appendix C, table C-10(s). Measurable levels of solvent-extractable tin were present in 72 percent of these samples. Most stations at the Naval Station, in Hampton Roads, and in the James River had no detectable solvent-extractable tin concentrations. Low concentrations (<25 ngSn/g) were found at several stations near pier areas at Newport News. Somewhat higher levels (30.78 ng/g mean solvent-

extractable tin) were detected in the vicinity of the moored tankers at station 7. Elevated concentrations were generally found in sediments of the Elizabeth River region, with a number of stations ranging from 25 to 150 ngSn/g. Sediment tin levels are illustrated in appendix A, figures A-19 and A-20, for the Norfolk Naval Complex, Elizabeth River, Hampton Roads, and the surrounding areas.

Tissues

Oysters (*Crassostrea virginica*) were collected from eight stations in the Norfolk area on 24 and 25 May 1984. Tissue data results from these stations (40 samples) are listed in appendix C, table C-10(t) and are plotted in appendix A, figures A-21 and A-22. Low-to-moderate levels (0.64-0.92/0.102-0.147 µg/g dry/wet weight) of organic solvent-extractable tin were observed in oyster tissues collected from the entrance to the James River, the center of Hampton Roads, and the southernmost station in the Elizabeth River. Tissues collected from stations along the waterfront of Norfolk Harbor showed significantly higher levels of solvent-extractable tin ranging from 1.55-7.85 µg/g dry weight (0.248-1.256 µg/g wet weight). Oyster tissues exhibited elevated levels of organic solvent-extractable tin in those samples from station 28 (middle of the Newport News waterfront), with a mean value of 5.11 µg/g dry weight (0.817 µg/g wet weight), while samples of oyster tissues from station 23 (off the end of Newport News Point) showed significantly lower levels (0.714/0.114 µg/g dry/wet weight). Stations 17 and 32 on the Elizabeth River had elevated levels with mean values of 4.37 and 6.29 µg/g dry weight (0.699 and 1.006 µg/g wet weight) respectively, suggesting moderate long-term inputs of organotins into the industrialized portions of the river.

LITTLE CREEK, VIRGINIA

General

Little Creek is a small coastal basin located along the southern shoreline of the entrance to Chesapeake Bay, approximately 9 miles (14.5 kilometers) west of Cape Henry. The majority of the creek comprises the Naval Amphibious Base. Many amphibious ships (including dock and tank landing ships and auxiliaries) are moored in the harbor. The harbor also contains a Navy floating dry dock, several privately owned marinas, and the Pennsylvania-Central Railroad railferry.

Water temperature and salinity data collected during the baseline survey on 29 May 1984 ranged from 12.8 (bottom) to 21.3°C and from 18.0 to 28.5 parts per thousand (entrance channel, at a depth of 9 meters), respectively. Surface salinities generally average from 20.5 to 22.5 parts per thousand; vertical stratification is usually noticeable during summer months, with deeper waters exhibiting average salinities approximately three to five parts per thousand higher than at the surface. Circulation is poor in the Little Creek estuary and tidal flux is the principal flushing force. The tidal range within Little Creek basin is a fairly uniform 2 to 3 feet (0.6 to 0.9 meters), and currents within the basin achieve a maximum velocity of 1.5 knots.

Since the damming of most of the tributaries of the estuary, fresh water input into the basin is negligible, consisting primarily of storm water runoff. Dissolved oxygen concentrations are normally near saturation levels throughout the water column, but have been observed to decline to values approaching zero near the bottom during summer months, usually concurrent with developing phytoplankton blooms. The main channel has a controlling depth of 19 feet (5.8 meters) and leads into a basin off the railroad terminal. Fine sand and silt are the predominate bottom constituents. Sediment surface quality is poor, with high levels of oil and oil by-products. Heavy metal concentrations within the sediments are roughly typical (except for elevated levels of copper and mercury) for other regions in Chesapeake Bay.

In the Little Creek estuary, benthic populations are depauperate within the inner basin, though more diverse communities are present in the inlet region. Blue crabs and quahog clams are present, but the region is closed to shellfishing due to elevated levels of coliform bacteria. Several commercially and recreationally important fish species, including bluefish, flounder, trout, and mullet, use the area as a forage site and as a protective habitat for juveniles, although the basin does not serve as a spawning ground or migratory pathway for anadromous fishes.

Thirteen primary sampling stations were established during the baseline survey at Little Creek. These stations were sampled on 29 May 1984. Sampling site locations can be found in figure 12.

Water

Thirteen stations were sampled on 29 May 1984. Five of the stations sampled (representing 38 percent of the samples analyzed) showed measurable levels of organotin compounds in Little Creek Harbor. These data are summarized in appendix C, table C-11(w). Stations 5 and 12 showed low levels of TBT (appendix A, figure A-23). Fisherman's Cove is the only region within Little Creek where recreational boats and yachts are moored; three of the five stations that had measurable surface water concentrations of TBT were located within that area. The mean water concentration of TBT for all stations within Fisherman's Cove was calculated at 0.021 μg/l. There are no naval vessels known to be coated with organotin AF paints in the Little Creek area.

Sediment

Thirty-nine sediment samples were collected from 13 stations located in the Little Creek basin. Analytical results for these samples are summarized in appendix C, table C-11(s). Measurable levels of solvent-extractable tin were present in 71 percent of the samples analyzed from Little Creek (see appendix A, figure A-24, for distribution). Sediment sample tin levels ranged from 0.7 (in the entrance cnannel) to 42.96 (station 9, adjacent to a floating dry dock). A mean sediment tin value for Little Creek samples was 8.5 ngSn/g (dry weight).

Tissues

Oysters (*Crassostrea virginica*) were collected from four stations (3B, 7A, 9A, and 13A) in Little Creek Harbor on 29 May 1984. Tissue analysis data can be found in appendix C, table C-11(t). Appendix A, figure A-25 presents the distribution of tin levels in oysters from the Little Creek region. None of the data from the four were

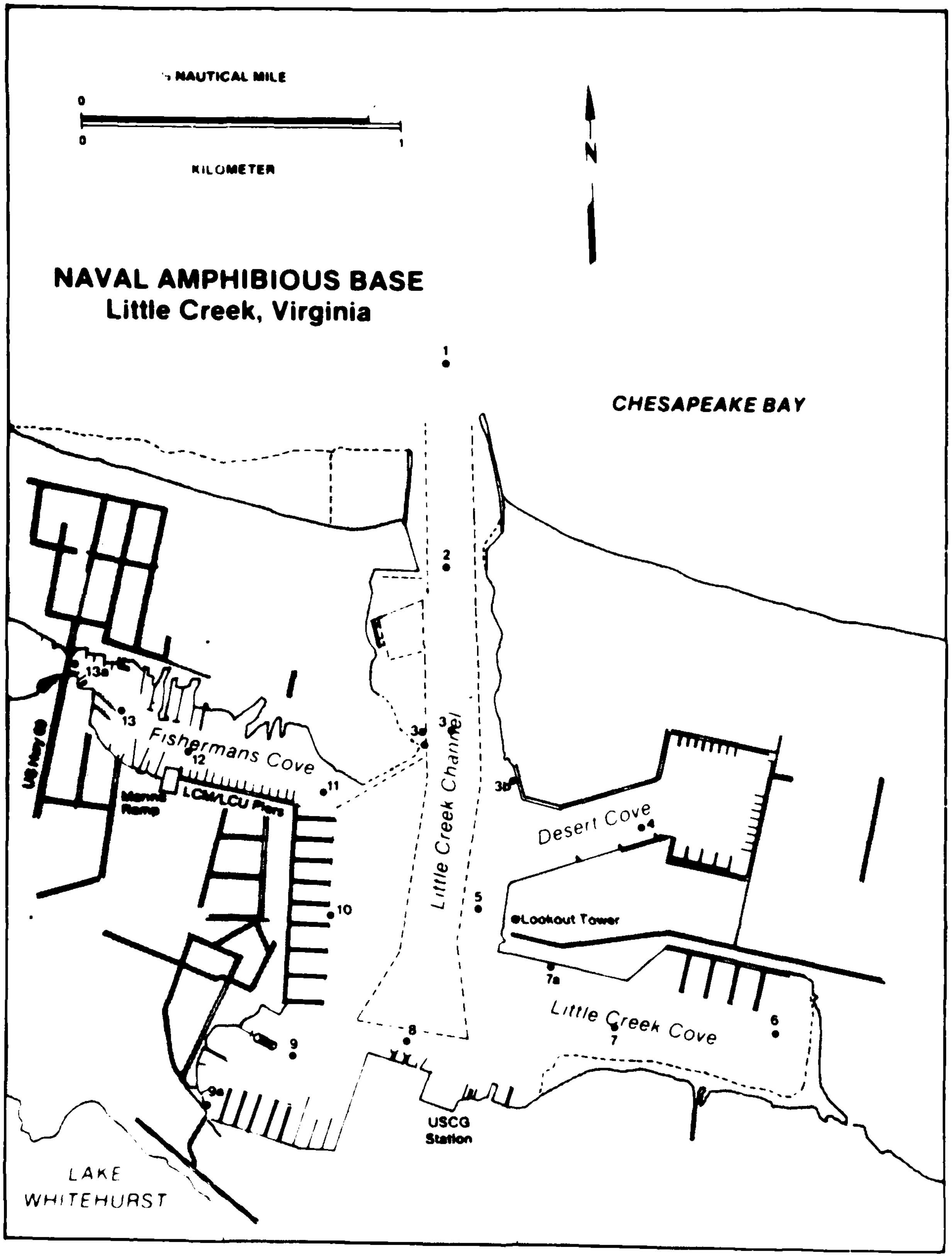


Figure 12. Sample station locations, Little Creek

significantly different from each other. The mean value for total solvent-extractable tin for oyster tissues from four stations in Little Creek was 0.84 μgSn/g dry weight (0.13 μgSn/g wet weight), the second lowest mean value observed in tissues collected during the baseline survey effort.

PHILADELPHIA (DELAWARE AND SCHUYLKILL RIVERS), PENNSYLVANIA

General

The Naval Base at Philadelphia is situated at the junction of the Delaware and Schuylkill Rivers, approximately 250 nautical miles upriver from the mouth of Delaware Bay. The base is south of the Philadelphia and Camden (New Jersey) waterfronts. The major Naval commands in the area consist of the Naval Base, Naval Station, the Philadelphia Naval Shipyard, and an inactive Ship Maintenance Detachment. Seven active and numerous mothballed Naval vessels are currently homeported in Philadelphia. A Coast Guard Base is located about 2-1/2 nautical miles upriver from the Naval Base on the Gloucester City, New Jersey, waterfront.

Philadelphia, the fifth largest city in the country, is a major seaport on the east coast of the United States. Its main waterfront extends for over 7 nautical miles (13 kilometers) along the west bank of the Delaware River. Also, the port facilities along the banks of the Schuykill River are capable of handling large quantities of bulk petroleum products, coal, and ore. Penn's Landing, midway up the length of Philadelphia's Delaware River waterfront area, accommodates a maritime museum, several museum ships, and several tour boats. The east bank of the Delaware River opposite the Philadelphia waterfront includes the Ports of Camden and Gloucester City, New Jersey.

The range of the tide at Philadelphia averages from 6 to 7 feet (1.8 to 2.1 meters) with currents following the main channels. The currents in the Delaware River vary in velocity and direction with the state of the tide, and the average peak current velocity is approximately 2.0 knots in the region of the Naval Base. The salt wedge extending up from the Atlantic Ocean normally terminates approximately 13 nautical miles downriver from the Naval Base, but may extend northward during periods of very low flow. The depth of the river averages 20 feet (6.1 meters), but the main shipping channel is maintained by dredging to a depth of 40 feet (12.2 meters). Water quality is generally poor, as the urban and industrial development of the surrounding areas are very high. Low dissolved oxygen levels, high levels of coliform bacteria, high levels of industrial-effluent pollutants, including phenols, mercury, lead and other metals, and low pH values are the major contributors (especially during the summer and autumn months) toward extremely impoverished to nonexistent biological communities.

There are no commercial fisheries of any consequence in the area, although some important anadromous fishes do traverse the river during seasonal migrations. Blueback herring, alewife, and shad have been reported in the waterways farther upstream, suggesting the use of the river as a migratory pathway. Population densities and diversity of benthic invertebrates and fish in the waters downstream of the Naval Base are very low, and overall environmental conditions imply that this would also be the case in the areas around the shipyard.

On 19 and 20 October 1985, samples were collected from 12 stations established in the Delaware River (see figure 13). Those stations are described in appendix B, table B-12.

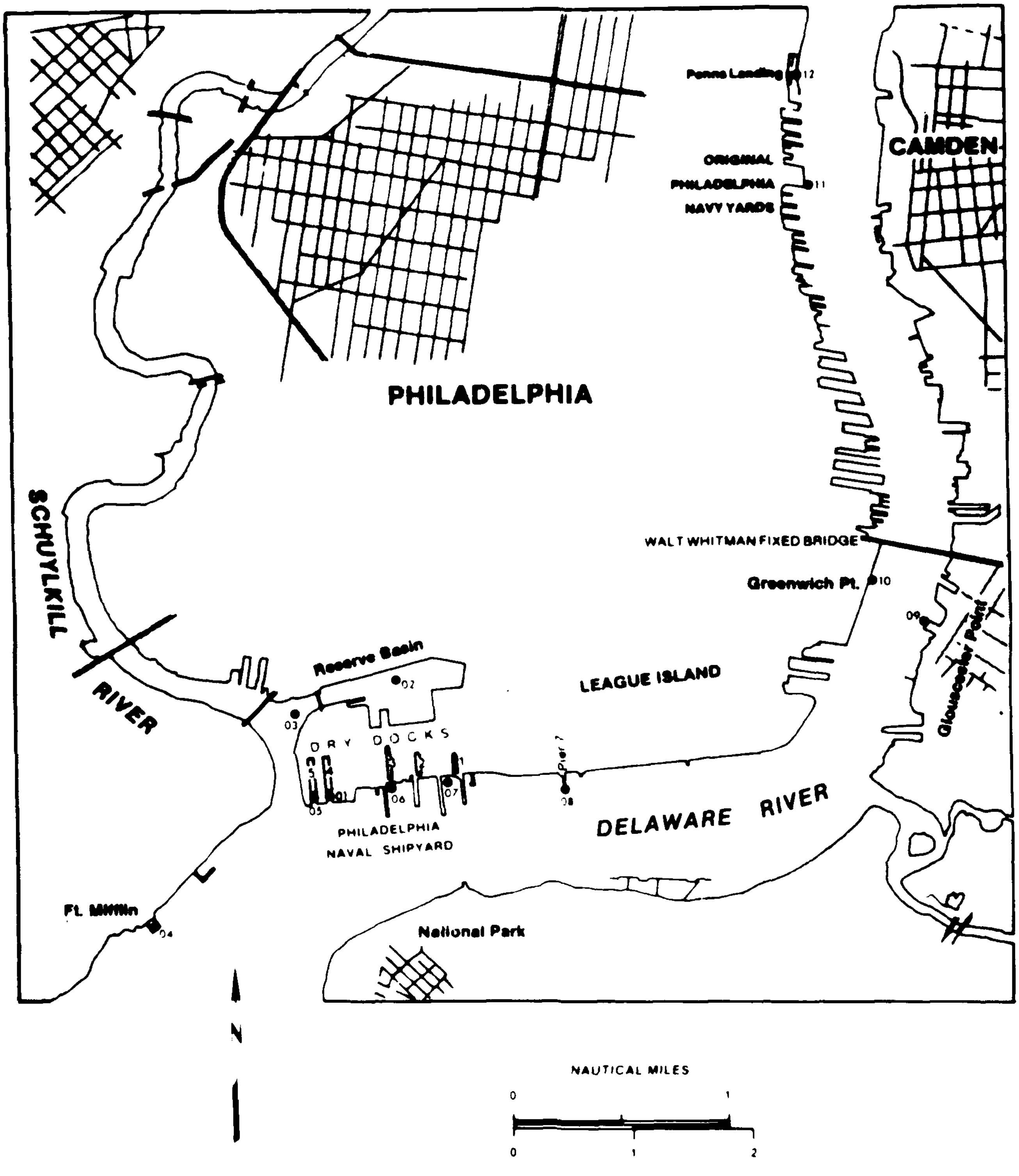


Figure 13 Sample station locations Philadelphia

Water

Water samples were collected from stations 1 through 12 on 19 October 1985. Data from those samples are presented in appendix C, table C-12(w). In all instances, no organotin was present in measurable amounts.

Sediment

Thirty-three sediment samples were collected from 11 stations in the Delaware River. Bottom conditions at station 11 prevented taking sediment samples at this location. Analysis of sediment samples taken during the baseline survey are in progress at this time.

Tissues

No tissue samples were collected during the baseline survey within the Philadelphia area, as neither mussels nor oysters were available in the any of the regions adjacent to sampling stations. Throughout the survey, a concerted, but unsuccessful, effort was made to locate any bivalves affixed to pilings or other substrates within the Delaware River system.

NEW LONDON/GROTON HARBOR COMPLEX (THAMES RIVER), CONNECTICUT

General

The harbor complex at New London is located at the mouth of the Thames River estuary, which extends 16 miles (25.7 kilometers) up from Long Island Sound. New London Harbor consists of a Main Harbor, which extends approximately 3.5 nautical miles (5.6 kilometers) from the river mouth to an array of highway and railway bridges, and an Inner Harbor, which continues upriver from that point for an additional 9 nautical miles (14.5 kilometers). For clarity, the harbor at New London is separated into two illustrations for this report (see figures 14 and 15). The Main Harbor houses the Port of New London on its west bank. The east bank of the harbor is occupied by the city of Groton. The Inner Harbor is the site of the New London Naval Submarine Base, Groton, and the United States Coast Guard Academy.

Major Naval commands in the Thames River include the Naval Submarine Base; Naval Underwater Systems Center [NUSC]; New London Laboratory; Naval Submarine Support Facility, New London; Naval Submarine School, Groton; a Submarine Group; and three Submarine Squadrons. In addition to the Academy, the Coast Guard also maintains a station at New London and a research and development center in Groton. Currently, 17 commissioned vessels are homeported at the Naval Submarine Base at Groton. Additionally, the Navy controls, through lease from the State of Connecticut, several berths at State Pier, the principal terminal of the Port of New London. Docking facilities are also present at the Coast Guard Academy and along the NUSC waterfront area.

The primary port facility of New London is at the State Pier terminal. Other major pier groups are distributed throughout the Main Harbor, at the site of the shipbuilding yard of General Dynamics Corporation's Electric Boat Division shipyard, and at the Pfizer Chemical Corporation's facility along the eastern bank of the lower

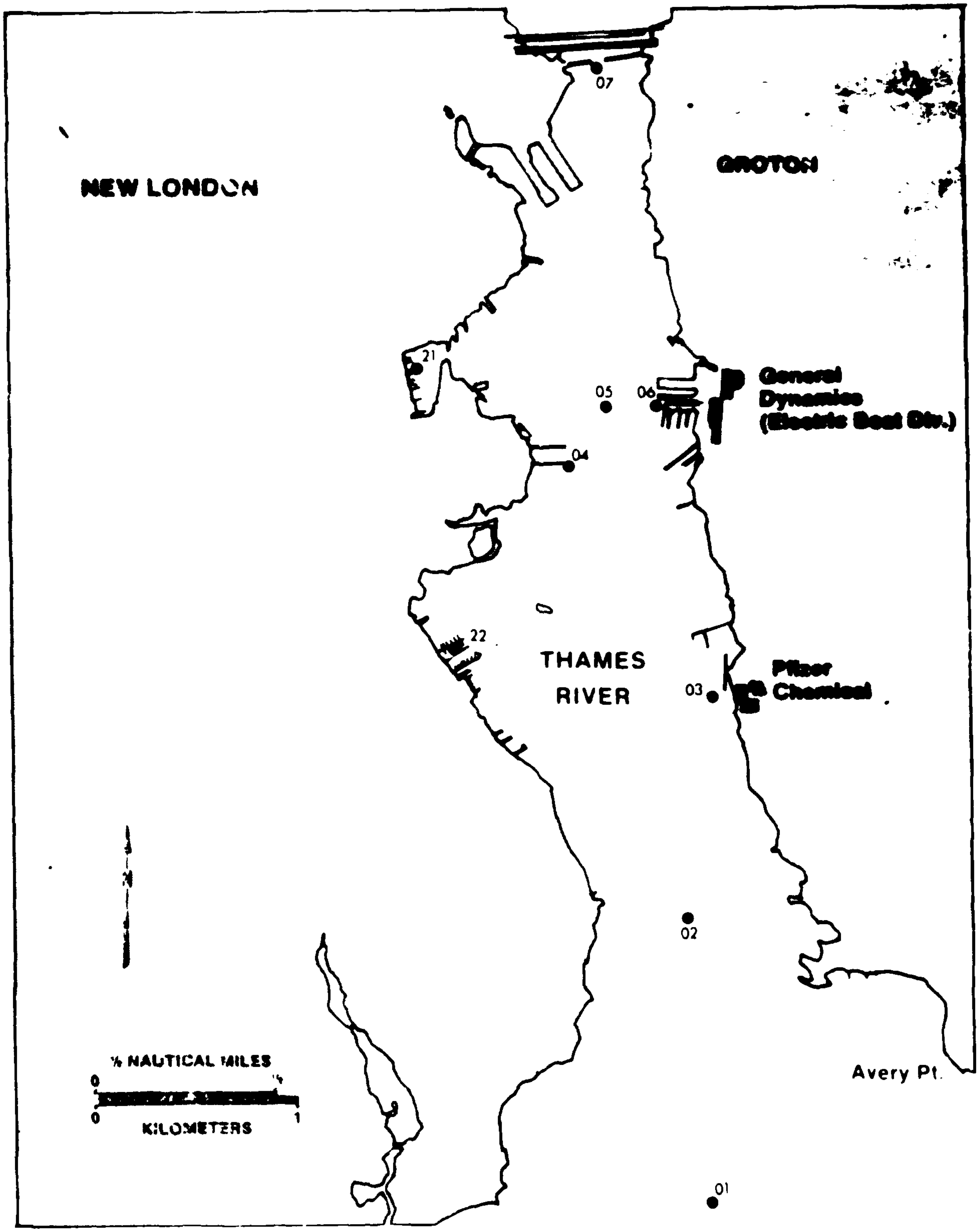


Figure 14. Sample station locations. New London–Groton Harbor Complex (southern part)

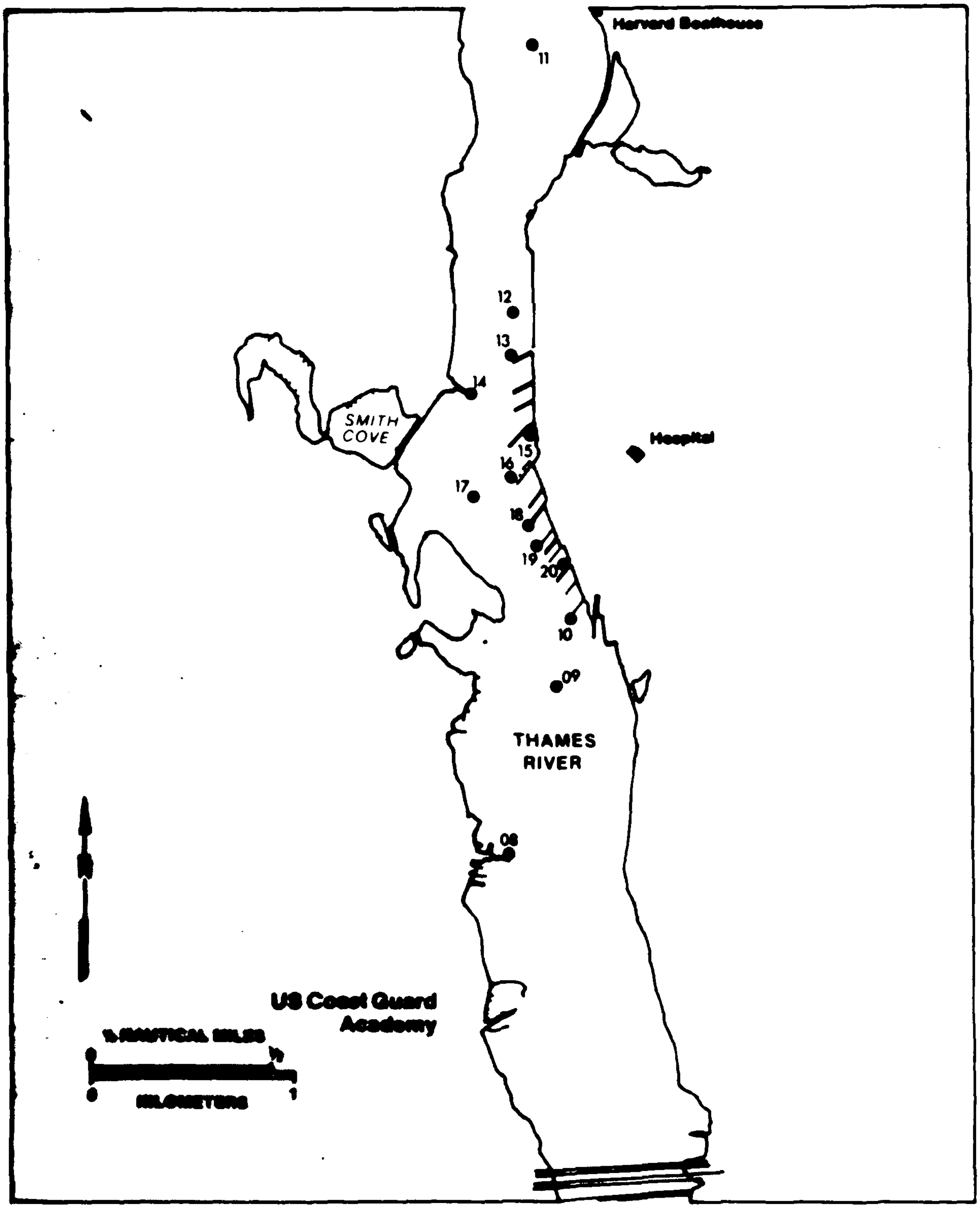


Figure 15 Sample station locations New London Groton Harbor Complex (northern part)

Thames River. Several small boat harbors and boatyards are located within the Thames River estuary.

The quality of the water in the Thames River estuary varies from poor, at the northern end near Norwich, to good at the mouth of the Thames River and Long Island Sound. The Thames River estuary receives significant inputs of fresh water at its upper reaches from the confluence of the Shetucket and Yantic Rivers. The saltwater tidal prism from Long Island Sound produces a two-layered flow in the middle reaches of the lower Thames River. The salinity in the estuary varies from 0 to 31 parts per thousand, depending on tide and current conditions. The tidal currents follow the general direction of the channel with velocities typically 1/2 to 3/4 knots. The mean tidal range is about 2.5 feet (0.76 meters), and depths in the main channel vary from 35 to 65 feet (10.7 to 19.8 meters) at MLLW. Sediments in the lower portion of the Thames River consist primarily of grey and black sticky mud and silt with a high clay component. Sediment loading of oil, grease, and various volatile petroleum products is high and increases with distance upriver. Heavy metal concentrations are similar to those established for Long Island Sound.

Aquatic biological resources are centered around numerous resident and migrant fish species that use the Long Island Sound region for feeding and reproduction. Species including flounder, bluefish, tomcod, striped bass, and herring maintain an active and productive sport fishery and support a limited commercial fishery in the estuary. The river is not a major waterway for anadromous fish migrations due to the historically poor water quality, especially in the freshwater areas surrounding Norwich. The benthic invertebrate fauna in the main channel areas is depauperate with pollutant-tolerant species being the dominant types. Shallower waters support a more diverse and abundant population. Large populations of clams, oysters, and scallops inhabit the estuary, but are unavailable for harvesting due to pollutant levels. Several economically important species of crabs, including blue crabs (*Callinectes sapidus*), are relatively common. Lobsters are found throughout the area (although primarily concentrated in deeper waters) and support a well-developed commercial fishery.

Twenty-two sampling stations were established in the Thames River estuary, extending from the river entrance to the middle reaches of the Thames River, about three-quarters of a nautical mile upriver from the Naval Submarine Base. These stations were surveyed from 8 to 12 November 1984 and are depicted in figures 14 (southern part) and 15 (northern part). Appendix B, table B-13 contains descriptions of the stations established and visited during the baseline survey effort.

Water

Surface water samples were collected from stations 1 through 22 during 8 to 12 November 1984. Twenty stations exhibited no detectable TBT at all (appendix C, table C-13(w)). The only area at which a measurable TBT level was established was station 22, in the center of Burr's Marina. The mean TBT level at that station was measured at 0.008 μg/l.

Sediment

The sediments at 20 stations were sampled on 8 and 9 November 1984 (appendix B, table B-13(s)). Sample analysis is in progress at this time.

Tissues

Mytilus edulis tissue samples were collected from three stations on 9 November 1984 (appendix B, table B-13(t)). In addition, *Crassostrea virginica* tissue samples were collected from station 14 in lieu of mussel tissues, which were not available. Data from the analysis of these samples are pending.

NEWPORT (NARRAGANSETT BAY), RHODE ISLAND

General

Narragansett Bay, the approach to the cities of Newport, Providence, and Taunton, is located east of Long Island Sound approximately 17 nautical miles (31.5 kilometers) west of Buzzards Bay. The eastern shore of the bay is formed by Aquidneck Island, which is the largest island within the bay. The islands of Conanicut and Prudence, along with several additional smaller islands, divide Narragansett Bay into a shallower West Passage and a deeper East Passage, which is the primary entrance into the bay (see figure 16).

There is no Naval Station or Naval Base in the Newport area; however, area coordination is handled by the Naval Education and Training Center for various naval activities. Most of the naval activities are located along the western coastline of Aquidneck Island from Newport Harbor to Coggeshall Point. Major naval commands in the Narragansett Bay area includes NUSC; the Naval War College; Naval Construction Battalion Center, Davisville; Defense Fuel Support Point, Melville; and the Surface Warfare Officers School Command [SWOSCOLCOM]. Two 1,400-foot-plus piers are maintained by the Navy in Coddington Cove, primarily for use by training vessels assigned to SWOSCOLCOM, auxiliaries, and research support craft allocated to NUSC. At the time of the baseline survey, two frigates and one minesweeper were homeported in Newport. The Navy also maintains a small-craft boat basin on the southern end of Coasters Harbor Island capable of accommodating approximately 30 boats. A Coast Guard Station is located at Castle Hill, at the entrance to Narragansett Bay.

Newport Harbor is the principal anchorage and is capable of accommodating a large number of vessels. A fixed bridge connects Aquidneck Island to Goat Island, which divides Newport Harbor into an inner and outer harbor. The outer harbor extends west of Goat Island and north to Gould Island. The main waterfront of the inner harbor primarily supports a variety of commercial fishing and shellfishing craft. Two commercial boat yards maintain facilities in Newport Harbor. One is located along the waterfront of the inner harbor; the other, at Coddington Cove, includes several floating dry docks. The Newport Yacht Club Marina is at the northern end of the inner harbor. The southern portion of the inner harbor basin, Brenton Cove, is primarily used as a general anchorage, as is the region northeast of Goat Island. Mooring facilities are present at the Ida Lewis Yacht Club and along the western shoreline of Brenton Cove below Fort Adams. The Bend Boat Basin in Melville at Coggeshall Point is about 12 nautical miles north of Newport and is capable of accommodating about 200 vessels.

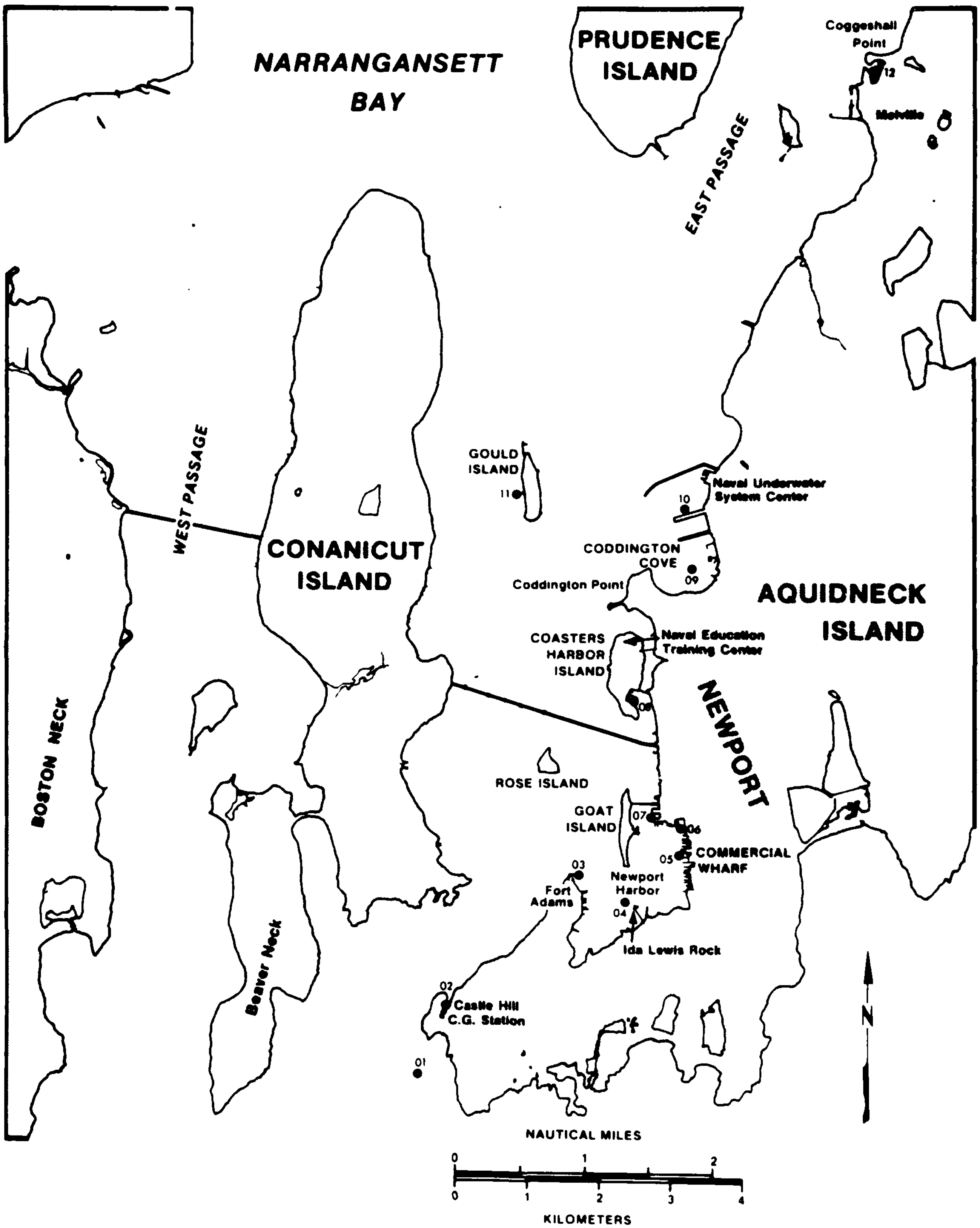


Figure 16. Sample station locations: Newport.

The mean tidal range within the entrance to Narragansett Bay is roughly 3.5 feet (1.1 meters), though storm winds frequently cause higher and lower tides. Normal tidal current velocities in the East Passage rarely exceed 1.5 knots. The water quality of Narragansett Bay is very good, well mixed, and with dissolved oxygen at near saturation levels. Mud is the predominate bottom type in the main channel areas.

The environmental resources of Narragansett Bay are intensely used; inshore recreational shorefishing occurs all year, although to a lesser extent in winter. Biological diversity is high, with many commercially significant species of fish and shellfish occurring in the region. Benthic populations are healthy; soft and hard substrate habitats are scattered in and around the bay. Bivalves are found throughout Narragansett Bay. Lobsters and crabs constitute significant economic resources in the region, and well-developed commercial lobster and scallop fisheries are present in Narragansett Bay. The northern portion of Prudence Island, plus many of the adjacent smaller islands and the attendant intertidal shorelines, constitute a national estuarine preserve and wildlife sanctuary.

The Newport Harbor baseline survey was conducted on 16 and 17 October 1985. The survey stations established are illustrated in figure 16.

Water

Surface water samples were collected from stations 1 through 12 on 16 October 1985 (appendix B, table B-14(w)). The poor flushing attributes of the small inlet containing the Coast Guard Station at Castle Hill, combined with the use of organotin-based AF paints, resulted in levels of TBT content (0.130 μg/l) over three times greater than the next lower station during the course of the survey. The Bend Boat Basin at Coggeshall Point, station 12, exhibited mean water TBT levels of 0.036 μg/l. The only other station exhibiting measurable traces of TBT was station 6, the Newport Yacht Club Marina. The level of TBT at station 6 was established at 0.009 μg/l. None of the other water samples contained measurable TBT (appendix C, table C-14(w)).

Sediment

Sediment samples were collected on 16 October 1985 from the Newport area at stations 1 through 12 during the baseline survey (see appendix B, table B-14(s)). Analysis of those samples is in progress at this time.

Tissues

Samples of *Mytilus edulis* tissues were collected from four stations in the Narragansett Bay area on 16 October 1985 (appendix B, table B-14(t)). Sample analysis is in progress.

PORTSMOUTH (PISCATAQUA RIVER), NEW HAMPSHIRE

General

The harbor at Portsmouth is located by the mouth of the Piscataqua River. The harbor encompasses a complex of islands, the main naval activities being located on Seavey Island (see figure 17), in the northwestern portion of the harbor. The city of

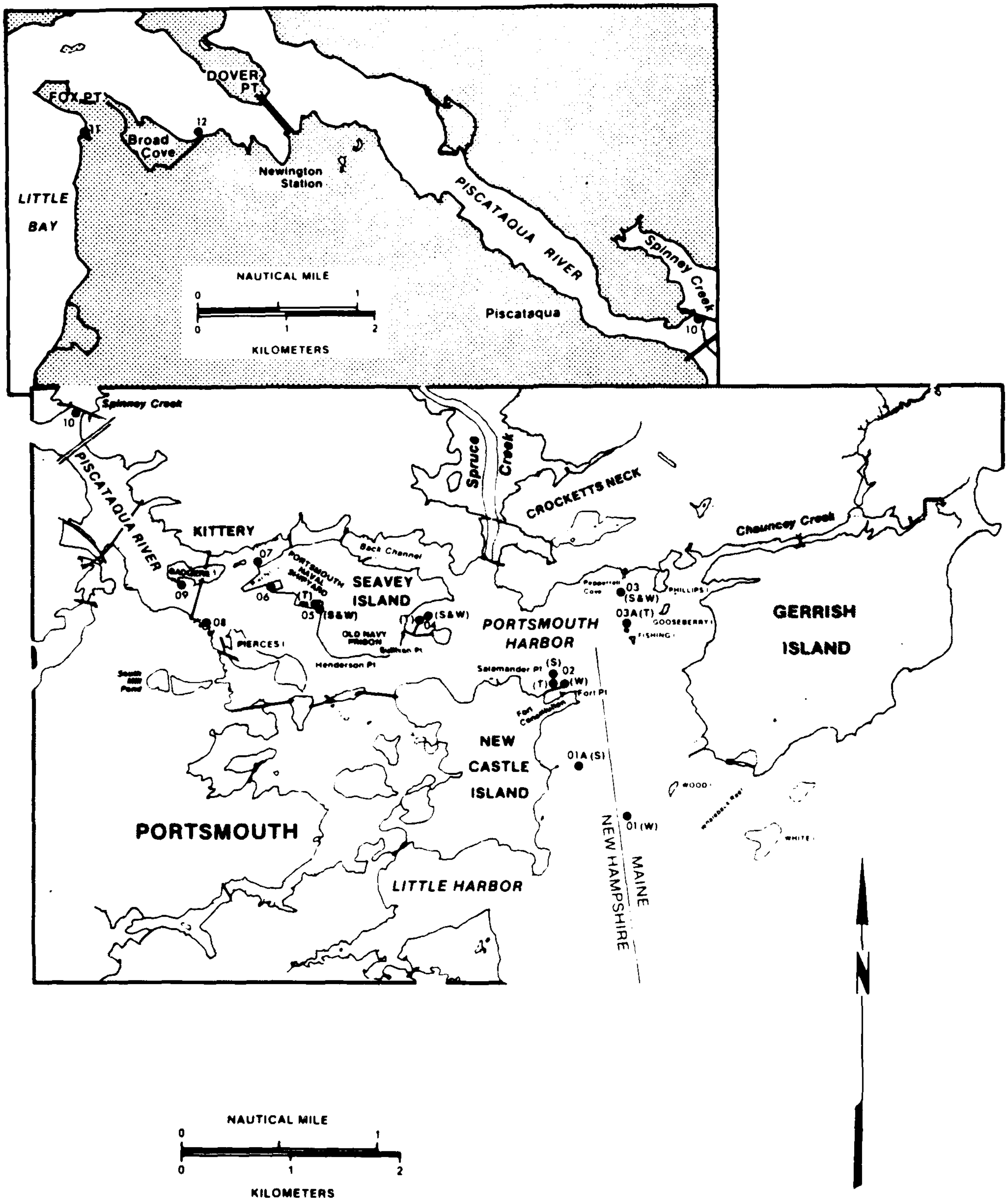


Figure 17. Sample station locations: Portsmouth

Portsmouth and town of Kittery, Maine, border the harbor on the west and east, respectively. Seavey Island is roughly 0.75 miles (1.2 kilometers) long and 0.6 miles (1.0 kilometers) wide at its greatest breadth. The major naval commands in the area consist of the Portsmouth Naval Shipyard and Naval Activities, Kittery, located on Seavey Island. A Coast Guard Station is located on the northeastern corner of New Castle Island at Fort Constitution in the center of the harbor. A submarine squadron and 17 service craft are homeported in Portsmouth. All commercial berthing facilities are located along the southern bank of the Piscataqua River south of Dover Point. Numerous recreational and commercial fishing and shellfishing vessels can be accommodated in Pepperrell Cove, Little Harbor, and in various other facilities located throughout Portsmouth Harbor and the Piscataqua River.

The mean tidal range in Portsmouth Harbor is 8.7 feet (2.7 meters). Tidal currents are very strong and generally set in the directions of the channels. The average velocities at flood and ebb for the mouth of the river at midchannel are around 1.2 and 1.8 knots, respectively. These increase in the vicinity of the Naval Shipyard to approximately 2.9 knots at flood tide and 3.1 knots at ebb. Temperature of the water in the shipyard areas ranges from 2 to 16°C, depending on seasonal factors. Surface salinities ranges from 22 to 31 parts per thousand with no significant vertical stratification.

The water quality of the lower Piscataqua River and Portsmouth Harbor are generally appraised as excellent, with high levels of dissolved oxygen and clarity. Biological diversity is high, and many commercially important species of fish and shellfish occur in the region. Resident fish populations include considerable numbers of smaller species, including silversides and sticklebacks; larger resident fish include hakes, pollock, cod, flounders, and sculpins. Migration pathways exist in the harbor for menhaden, striped bass, and bluefish, as well as the migratory component of several anadromous fish populations, including the Atlantic smelt, alewife, Atlantic herring, and the introduced Pacific coho salmon. Benthic populations are typically diverse, estuarine communities with soft substrate, hard substrate, and coastal saltmarsh habitats scattered in and around the harbor. Bivalves are common in mud and gravel substrates surrounding the harbor, and lobsters and crabs constitute a commercial resource of substantial economic consequence in the region.

The region was surveyed during 12 to 14 October 1985, and 12 primary stations were established in the Piscataqua River extending from its mouth to Little Bay near the confluence of the Piscataqua, Oyster, and Bellamy Rivers. The 12 stations selected for sampling during the baseline survey of the Portsmouth area are illustrated in figure 17.

Water

Water samples were collected on 12 and 14 October 1985 from 12 stations in the Portsmouth area. The water column butyltin content data are outlined in appendix A, figure A-30. The only measurable trace of any butyltin species was encountered at station 9, in the center of the Badgers Island Marina (see appendix C, table C-15(w)). No measurable TBT was discerned in any of the areas surveyed.

Sediment

Sediment samples were collected at the same time as the water samples from stations 1 through 12 (see appendix B, table B-15(s)). Sediment tin content analysis is in progress at this time.

Tissues

Five samples of *Mytilus edulis* tissues were collected on 12 October 1985 from each station indicated in appendix B, table B-15(t)). Analysis of those samples is in progress.

DISCUSSION

The 15 harbors surveyed show a substantial range of organotin loading as observed from water, sediment, and tissue samples. Generally, whenever organotin was measured in water column samples, sediment and tissue samples contained a roughly proportional amount of solvent-extractable tin.

Major use categories were predefined for individual sampling stations at each harbor location and are summarized in table 2. Station selection was distributed among the three use regions: (1) Naval operational areas, (2) commercial and recreational vessel moorage and repair facilities, and (3) areas of special ecological importance. Examination of figures A-1 through A-30 in appendix A reveals that, in *most cases, the areas of highest organotin* concentrations in water, sediments, and tissues are those regions of commercial and private vessel moorage and repair facilities. These data are summarized in table 3. Mean surface water concentrations of TBT for each harbor use category at each of the 15 harbors surveyed are illustrated in figure 18.

Although subsequent refinements in techniques allowed for lowered detection levels after the survey in Pearl Harbor was conducted, total water levels of TBT at Pearl Harbor are commensurate with those observed in the Piscataqua River region (i.e., no measurable TBT ascertainable in any of the water samples). In addition to Portsmouth and Pearl Harbor, no butyltin was detected in the water column at Philadelphia or within Mayport Basin. In Bremerton, Charleston, Mare Island Strait, the Thames River (New London), and San Francisco Bay low to moderate levels were measured at commercial/recreational areas; however, no measurable butyltins were observed in areas under Navy jurisdiction. In 13 locations, the level of TBT in the water column exceeded the 0.05 μgTBT/l limit estimated by the Navy to be a safety limit for long-term exposure (Department of the Navy, 1985). These areas were found adjacent to commercial dry-dock and berthing facilities and within marinas in San Diego, Oakland Inner Harbor, Honolulu Harbor, and the Elizabeth River region (table 4).

In evaluating total organotin concentration (water, sediment, and tissue loadings considered together), Pearl Harbor is clearly at the low end of the range, while Honolulu Harbor exhibits some of the highest levels detected. Pearl Harbor is used primarily by the Navy, while Honolulu Harbor is mainly used by commercial vessels, including many whose hulls are coated with organotin AF paints. Detailed comparisons between Navy and non-Navy organotin effects in Pearl Harbor and Honolulu Harbor are not presently feasible; however, this pair of Hawaiian harbors may be useful for future comparisons during organotin monitoring studies. While Honolulu Harbor may be

considered a worst-case situation with respect to organotin loading, the circulation dynamics and biotic components (notably corals and fish) are considerably superior to those in Pearl Harbor. Mare Island Strait ranked as the second lowest region, overall, followed by Little Creek. Norfolk and San Diego Bay ranked closely together, with mixed Navy, commercial, and recreational vessel areas.

Marinas represent a major source of organotin loading to the harbors surveyed (table 4). Further examination of the data listed in appendix C reveals that small-boat marinas clearly represent the single greatest source of organotin loading in San Diego Bay. These sites are customarily closely circumscribed by breakwaters, or other features, which serve to restrict water circulation, and contain several thousand privately owned vessels many of which are coated with organotin-bearing AF paints leaching at a high rate. Many of these vessels remain in the marinas for extended periods and are used primarily on weekends and during the summer. Recent water column measurements in San Diego Bay marinas suggest significant increases in TBT concentrations over the last several years (Seligman, et al., 1986, & Valkirs, et al., 1986).

The degradation of TBT in seawater is of major interest as toxicity greatly decreases with debutylation (Wong et al., 1982; Laughlin et al., 1985, & Walsh, et al. 1985). TBT is removed from the water column through particulate adsorption, uptake in the sediments, degradation by bacteria, and uptake by biota (Dooley & Homer, 1983). Organotins have been determined to be relatively immobile in anaerobic sediments, exhibiting no significant desorption over a 10-month period (Maguire, 1984); however, Salazar and Salazar (1985) demonstrated that bioavailablity of TBT was lowered by sorption onto sediments and elevated levels of organotins are not necessarily toxic to marine organisms. Microbial metabolism of TBT in the water column has been demonstrated to take place within 1 to 2 weeks under aerobic conditions (Seligman, et al., 1986c). Naturally occurring microbial populations have also been shown to mobilize tin in ecosystems by transforming inorganic tin in sediments to dimethyltin and trimethyltin (Hallas et al., 1982). Half-lives of TBT have been estimated by Waldock et al. (1983) to be approximately 10 days for two species of oysters (*Crassostrea gigas* and *Ostrea edulis*).

Table 2. Major harbor use categories by area.

Location	Category*	Station Numbers
San Diego Bay, CA	Navy	3-5, 13, 15, 20-33, 37-42
	Com/Rec	7-12, 14, 16-17, 19, 48A, 49A, 50-51
	Ecol	1-2, 6, 18, 34-36, 43, 44-49, 52
Los Angeles/ Long Beach, CA	Navy	4-9, 4A, 5A, 8A
	Com/Rec	3, 10-15, 18, 18A
	Ecol	1-2, 16-17
San Francisco Bay, CA	Navy	1, 6, 9, 11-12
	Com/Rec	2-5, 7-8, 10, 13, 15-16
	Ecol	14, 17-18
Mare Island Strait, CA	Navy	4-5, 7-9, 11, 13
	Com/Rec	6, 10, 12, 14-16
	Ecol	1-3, 17-18
Bremerton, WA	Navy	11-18
	Com/Rec	2, 5-6, 9-10
	Ecol	1, 3-4, 7-8
Pearl Harbor, HI	Navy	6-13, 17-19
	Com/Rec	2, 14, 16
	Ecol	1, 3-5, 15, 20
Honolulu Harbor/ Kewalo Basin, HI	Navy	NONE
	Com/Rec	1-4, 6-8
	Ecol	5
Mayport, FL	Navy	3-10, 3A, 10A
	Com/Rec	11, 13-15
	Ecol	1-2, 12, 16, 1A
Charleston, SC	Navy	14-15, 17, 20-23, 25
	Com/Rec	3-4, 6-12, 18-19
	Ecol	1-2, 5, 13, 16, 24
Norfolk, VA	Navy	3-5, 8-9, 14, 18-21, 30
	Com/Rec	7, 10-13, 17, 22-24, 27-28, 31-32
	Ecol	1-2, 6, 15-16, 25-26, 29
Little Creek, VA	Navy	4-7, 9-12
	Com/Rec	8, 13, 13A
	Ecol	1-3

Table 2. Major harbor use categories by area (continued).

Location	Category*	Station Numbers
Philadelphia, PA	Navy	1-3, 5-8
	Com/Rec	4, 9-12
	Ecol	NONE
Newport, RI	Navy	8-10
	Com/Rec	2-7, 12
	Ecol	1, 11
New London/Groton, CT	Navy	4, 10-16, 18-20
	Com/Rec	3, 6, 8, 21-22
	Ecol	1-2, 5, 7, 9, 17
Portsmouth, NH	Navy	4-7
	Com/Rec	2, 8-10, 12
	Ecol	1, 1A, 3, 3A, 11

* Categories:

Navy = US Navy activities, berths, and repair facilities

Com/Rec = Commercial/recreational vessel activities, berths, and repair facilities (includes US Coast Guard facilities)

Ecol = Areas of special environmental significance: fisheries, migratory, nursery, spawning grounds, unimpacted wildlife habitats, etc.

Table 3. Mean surface water TBT concentration summary for each harbor use classification.

Location/ Use Category*		Mean	stdv (Values in μgTBT/l)	n
San Diego Bay, CA/				
	Navy	0.017	0.010	18
	Com/Rec	0.110	0.013	18
	Ecol	0.008	0.010	18
Los Angeles/Long Beach CA/				
	Navy	0.010	0.012	12
	Com/Rec	0.017	0.008	13
	Ecol	<0.005	-	7
San Francisco Bay, CA/				
	Navy	<0.005	-	10
	Com/Rec	0.049	0.049	19
	Ecol	<0.005	-	7
Mare Island Strait, CA/				
	Navy	<0.010	-	9
	Com/Rec	0.009	0.019	14
	Ecol	<0.010	-	9
Bremerton, WA/				
	Navy	<0.005	-	6
	Com/Rec	0.003	0.005	13
	Ecol	<0.005	-	4
Pearl Harbor, HI/				
	Navy	<0.010	-	13
	Com/Rec	<0.010	-	9
	Ecol	<0.010	-	12
Honolulu, HI/				
	Navy	NA	NA	NA
	Com/Rec	0.097	0.074	9
	Ecol	<0.010	-	9
Mayport, FL/				
	Navy	<0.005	-	16
	Com/Rec	<0.005	-	10
	Ecol	0.005	0.007	5
Charleston, SC/				
	Navy	<0.005	-	13
	Com/Rec	0.004	0.009	14
	Ecol	<0.005	-	12

Table 3. Mean surface water TBT concentration summary for each harbor use classification (continued).

Location/ Use Category		mean	stdv (Values in μgTBT/l)	n
Norfolk, VA/				
	Navy	0.014	0.018	12
	Com/Rec	0.028	0.038	11
	Ecol	0.0007	0.003	14
Little Creek, VA/				
	Navy	0.010	0.016	9
	Com/Rec	0.013	0.012	3
	Ecol	0.003	0.005	4
Philadelphia, PA/				
	Navy	<0.005	-	13
	Com/Rec	<0.005	-	9
	Ecol	NA	NA	NA
Newport, RI/				
	Navy	<0.005	-	4
	Com/Rec	0.026	0.040	10
	Ecol	<0.005	-	9
New London/Groton, CT/				
	Navy	<0.005	-	18
	Com/Rec	0.001	0.003	15
	Ecol	<0.005	-	9
Portsmouth, NH/				
	Navy	<0.005	-	8
	Com/Rec	<0.005	-	7
	Ecol	<0.005	-	9

NA - Not applicable.

* Use category.

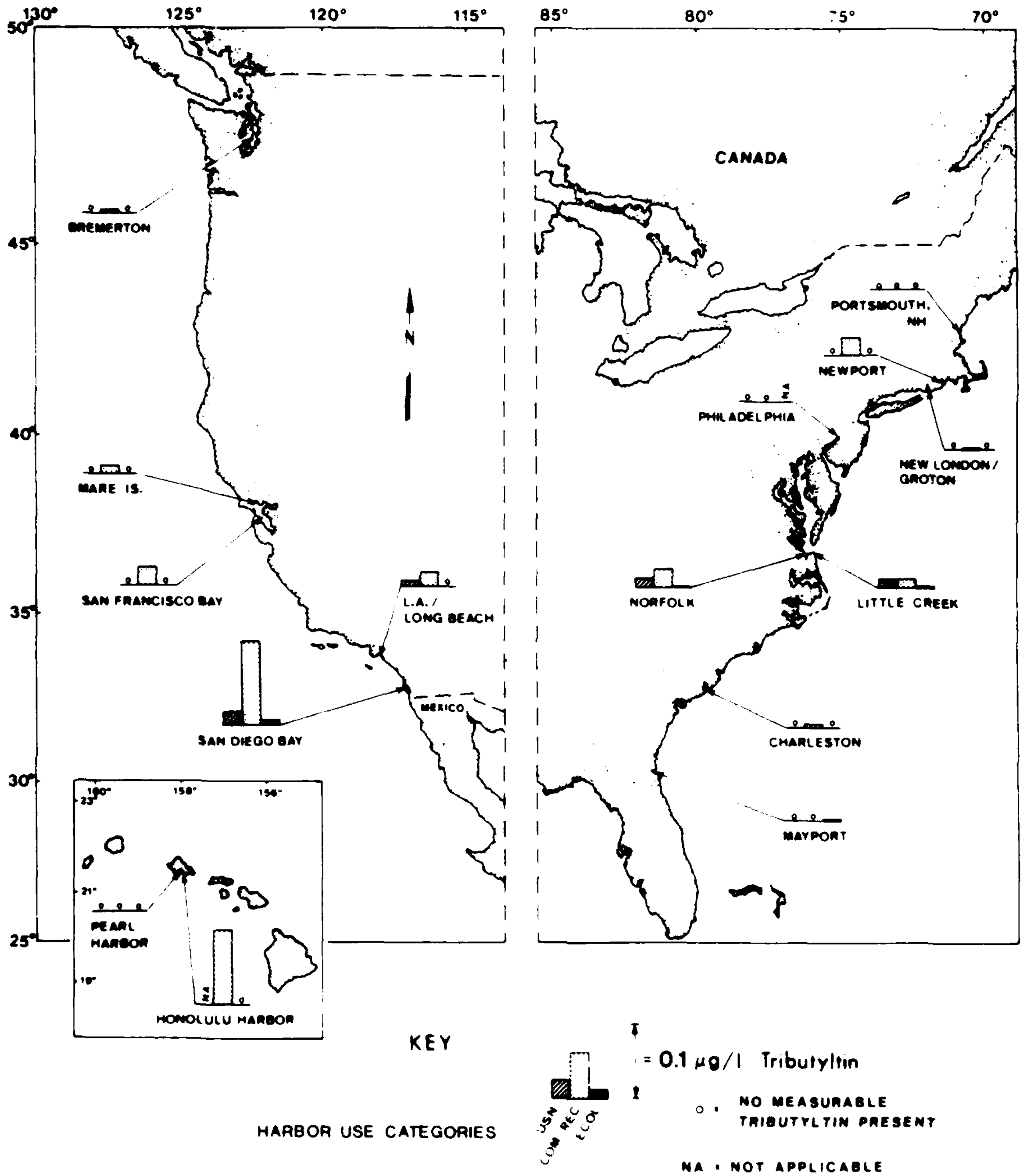


Figure 18 Mean surface water concentrations of TBT at 15 US harbors by use category

Table 4. Mean surface water tin concentration summary in marinas, boat basins, and adjacent to commercial dry docks, piers, and berthing areas.

Location	Minimum	Maximum	Mean	Stdv
	(Values in μg/TBT/l)			
San Diego Bay, CA				
Shelter Island Yacht Harbor	0.187	0.350	0.247	0.080
Commercial Basin, Shelter Island	0.189	0.197	0.192	0.004
Intercontinental Marina	0.030	0.060	0.047	0.002
Los Angeles/Long Beach Harbor, CA				
Naval Station Yacht Club Marina	0.019	0.024	0.021	0.004
Long Beach Inner Harbor Marina	0.019	0.027	0.024	0.005
Cerritos Channel Boat Basin	0.014	0.016	0.015	0.001
Todd Shipbuilding Facility	0.022	0.023	0.023	0.001
Los Angeles Inner Harbor Marina	-	-	0.023	-
Long Beach Shoreline Marina	0.095	0.119	0.108	0.012
San Francisco Bay, CA				
Marina, Fortmann Basin	0.019	0.050	0.031	0.013
Pacific Drydock & Repair Facility	0.090	0.158	0.129	0.035
Mare Island Strait, CA				
Vallejo Yacht Club Marina	0.034	0.046	0.039	0.006
Vallejo Municipal Marina	-	-	<0.010	-
Bremerton, WA				
Port Orchard Marina	0.004	0.009	0.007	0.004
Port Orchard Yacht Club Marina	-	-	0.017	-
Pearl Harbor, HI				
Rainbow Marina	<0.010	<0.010	<0.010	-
Honolulu, HI				
Kewalo Basin	0.045	0.084	0.059	0.021
Snug Harbor, Kapalama Basin	0.086	0.094	0.089	0.005
Dillingham Drydock Facility	-	-	0.265	-
Matson Containership Terminal	-	-	0.139	-
Mayport, FL				
Marty's Marina, St. John's River	<0.005	<0.005	<0.005	-
Charleston, SC				
Toddler's Cove Marina	-	-	<0.005	-
Charleston Municipal Marina	0.009	0.009	0.009	0.000
Norfolk, VA				
NAS Marina, Willoughby Bay	-	-	0.012	-
Portsmouth Yacht Harbor	-	-	0.023	-
NORSHIPCO Drydock Facility	-	-	0.110	-
Tanker Anchorage, Hampton Roads	-	-	0.060	-

Table 4. Mean surface water tin concentration summary in marinas, boat basins, and adjacent to commercial dry docks, piers, and berthing areas (continued).

Location	Minimum	Maximum	Mean	Stdv
	(Values in μg TBT/l)			
Little Creek, VA				
Fisherman's Cove	0.020	0.041	0.021	0.015
Philadelphia, PA				
Penn's Landing Marina	-	-	<0.005	-
Newport, RI				
Coast Guard Station, Castle Hill	-	-	0.130	-
Newport Yacht Club Marina	0.008	0.010	0.009	0.001
Bend Boat Basin Marina	0.028	0.042	0.036	0.007
New London/Groton, CT				
Burr's Marina	0.006	0.009	0.008	0.002
Portsmouth, NH				
Great Bay Marina, Broad Bay	<0.005	<0.005	<0.005	-
Badgers Island Marina	<0.005	<0.005	<0.005	-

Degradation may also occur through the photolysis of the tin-carbon bond by ultraviolet (UV) irradiation, gamma irradiation, and thermal cleavage, although of these only UV-induced degradation is likely to be significant and only within the surface microlayer (Blunden & Chapman, 1986). Recent studies at NOSC in San Diego have demonstrated TBT degradation rates of 5 to 13 percent per day in microcosm experiments using both radio-labeled and unlabeled TBT-spiked water from San Diego Bay (Seligman et al., 1986c). Similar degradation rates have been found in the Skidaway estuary (Seligman, et al., 1986b) and the Norfolk region (R. Lee, Skidaway Institute of Oceanography, unpublished data). The principal degradation product was dibutyltin. Maguire, Carey, and Hale (1983) have demonstrated that, in sunlight, TBT photolyses with an approximate half-life of greater than 89 days, although Davies and Smith (1980) report the half-life of TBTO in pond water to be 16 days. Also TBT at high concentrations (>100 ppb) is nonvolatile and does not appreciably degrade in the dark at 20°C over a 2-month period.

Difficulties still exist in the determination of extremely low levels of organotin compounds. Many areas sampled during these baselines surveys (especially in the relatively unimpacted ecologically important areas) were below detection limits. Until ultratrace analytical capabilities are further enhanced, the reporting of absolute environmental concentrations in some areas and assessing small increases in regional TBT levels will not be possible. Major changes in TBT concentrations, however, will be able to be detected long before hazardous levels are reached.

ABBREVIATIONS

AF	Antifouling paint
AFDM	Auxiliary floating drydock, medium
$BuSnH_3$	Butyltin trihydride
Bu_2SnH_2	Dibutyltin dihydride
Bu_3Sn	Tributyltin
Bu_3SnH	Tributyltin hydride
C	Celsius (degrees centigrade)
EA	Environmental Assessment
g	gram(s)
GC/MS	Gas chromatography/mass spectroscopy
GFAAS	Graphite furnace atomic absorption spectroscopy
HCl	Hydrochloric acid
HDAA	Hydride derivatization atomic absorption
km	kilometer(s)
l	liter(s)
m	meter(s)
mg	milligram(s)
MIBK	Methyl isobutylketone
ml	milliliter(s)
MLLW	Mean lower low water
mm	millimeter(s)
μg	micrograms
N	normal, normality
$NaBH_4$	Sodium borohydride
NaOH	Sodium hydroxide
ng	nanograms (= 0.001 micrograms)
nm	nanometer(s)
NOSC	Naval Ocean Systems Center, San Diego
NSRDC	Naval Ship Research and Development Center
NUSC	Naval Underwater Systems Center
OTHBS	Organotin Harbor Baseline Survey
pH	Hydrogen ion concentration
ppm	parts per million = micrograms/g
ppb	parts per billion = micrograms/l or ngSn/g
rpm	revolutions per minute
SIMA	Shore Intermediate Maintenance Activity
Sn	Tin
SnH_4	Tin (IV) hydride
SPC	Self-polishing copolymer
sq	square
stdv	standard deviation
SWOSCOLCOM	Surface Warfare Officers School Command
TBT	Tributyltin
TBTO	Bis tri-*n*-butyltin oxide
UV	Ultraviolet

REFERENCES

Barug, D. (1982). Microbial Degradation of Bis (Tributyltin) Oxide, *Chemosphere*, 10:1145-1154.

Blair, W.R., Olson, G.J., Brinckman, F.E., Paule, R.C., and Becker, D.A. (1986). *An International Butyltin Measurement Methods Intercomparison: Sample Preparation and Results of Analyses*. NBSIR 86-3321, National Bureau of Standards, Gaithersburg, MD.

Blunden, S.J., and Chapman, A. (1986). *Organotin Compounds in the Environment, in: Organometallic Compounds in the Environment* (Craig, P.J., ed.). Longman Group Limited, London, pp 111-159.

Boettner, E.A., Ball, G.L., Hollingsworth, Z., and Aquino, R. (1984). Organic and Organotin Compounds Leached from PVC and CPVC Pipe. *Mar. Poll. Bull.*, 15:402-405.

Braman, R.S., and Tompkins, M.A. (1979). Separation and Determination of Nanogram Amounts of Inorganic Tin and Methyltin Compounds in the Environment, *Analytical Chemistry*, 51:12-19.

Brinckman, F.E. (1984). Environmental Effects of Organotins. *Proceedings of the Fourth International Conference on the Organometallic and Coordination Chemistry of Germanium, Tin and Lead.* McGill University, Montreal, Aug 8-12.

California State Water Resources Control Board (1982). California Mussel Watch: 1980-1981, Trace Metals and Synthetic Organic Compounds in Mussels from California's Coast, Bays and Estuaries. *Water Quality Monitoring Report* No. 81-11 TS.

Davies, A.G., and Smith, P.J. (1980). Recent Advances in Organotin Chemistry, *Adv. Inorg. Chem. Radiochem.*, 23:1-77.

Department of the Navy, (1985). *Fleet-Wide Implementation of Organotin Antifouling Hull Paints: Interim Finding of No Significant Impact*. Naval Sea Systems Command, Washington, D.C., 128 pp + appendices.

Dooley, C.A., and Homer, V., (1983). *Organotin Compounds in the Marine Environment: Uptake and Sorption Behavior* (NOSC Technical Report 917) San Diego: Naval Ocean Systems Center.

Farrington, J.W., (1983). Bivalves as Sentinels of Coastal Chemical Pollution: The Mussel (and Oyster) Watch, *Oceanus*, 26(2):18-29.

Goldberg, E.D., Parker, P.L., Bowen, V.T., Risebrough,R.W., Farrington, J.W., Robertson, W., Harvey,G., Schneider, E., Martin, J.H., and Gamble, E. (1978). The Mussel Watch, *Environmental Conservation*, 5(2):105-125.

vhoug, J.G. (1979). *Marine Environmental Assessment at Three Sites in Pearl Harbor, Oahu August-October 1978* (NOSC Technical Report 441) San Diego: Naval Ocean Systems Center.

Guard, H.E., Cobet, A.B., and Coleman, W.M. III (1981). Methylation of Trimethyltin Compounds by Estuarine Sediments, *Science*, 213:770-771.

Hall, L.W., and Pinkney, A.E. (1985). Acute and Sublethal Effects of Organotin Compounds on Aquatic Biota: An Interpretative Literature Evaluation, *CRC Critical reviews in Toxicololgy*, 14(2):159-209.

Hallas, L.E., Means, J.C., and Cooney, J.J. (1982). Methylation of Tin by Estuarine Organisms, *Science*, 215:1505-1507.

Haven, D.S., and Fritz, L.W., (1985). Setting of the American Oyster *Crassostrea virginica* in the James River, Virginia, USA: Temporal and Spatial Distribution, *Marine Biology*, 86:271-282.

Haven, D.S., Hargis W.J. Jr., and Kendal, P.C. (1978). *The Oyster Industry of Virginia: Its Status, Problems and Promise*. Virginia Institute of Marine Science Special Report No. 168.

Haven, D.S., and Whitcomb, J.P. (1983). The Origin and Extent of Oyster Reefs in the James River, Virginia, *Journal of Shellfish Research*, 3(2):141-151.

Hodge, V.F., Seidel, S.L., and Goldberg, E.D. (1979). Determination of Tin (IV) and Organotin Compounds in Natural Waters, Coastal Sediments, and Macro Algae by Atomic Absorption Spectrometry, *Analytical Chemistry*, 51:1256-1259.

Laughlin, R.B., Johnston, R.B., French W., Guard, H., and Brinckman, F.E. (1985). Structure Activity Relationships for Organotin Compounds, *Environ. Toxicol. Chem.*, 4:343-351.

Maguire, R.J. (1984). *Transformation of Tributyltin Species in Toronto Harbor Sediments*, ENVR-31 Presented at 188th Annual Meeting of the American Chemical Society, Philadelphia.

Maguire, R.J., Carey, J.H., and Hale, E.J. (1983). Degradation of the Tri-n-butyltin Species in Water, *Journal of Agricultural and Food Chemistry*, 31:1060-1065.

Martin, M. (1985). State Mussel Watch: Toxics Surveillance in California, *Marine Pollution Bulletin*, 16(4):140-146.

Martin, M., Ichikawa, G., Goetzl, J. and de los Reyes, M. (1982). *An Evaluation of Physiological Stress in Mussels Related to Toxic Substances-Tissue Accumulation in California Marine Waters*, California State Water Resources Control Board Special Projects Report No. 82-2SP, 90pp.

Peeling, T.J. (1975). *A Proximate Biological Survey of San Diego Bay, California*, NUC [now NOSC] Technical Paper 389, Revision 1, San Diego: Naval Undersea Center.

Salazar, M.H., and Salazar, S.M. (1985). *Ecological Evaluation of Organotin-Contaminated Sediment*. (NOSC Technical Report 1050) San Diego: Naval Ocean Systems Center.

Seligman, P.F., Grovhoug, J.G., and Richter, K.E. (1986a). Measurements of Butyltins in San Diego Bay, CA: A Monitoring Strategy, *Oceans '86 Proceedings*, Organotin Symposium, Washington, DC, vol. 4, pp. 1289-1296.

Seligman, P.F., Valkirs, A.O., and Lee, R.F. (1986b). Degradation of Tributyltin in Marine and Estuarine Waters, *Oceans '86 Proceedings*, Organotin Symposium, Washington, DC, vol. 4, pp. 1189-1296.

Seligman, P.F., Valkirs, A.O., and Lee, R.F. (1986c). Degradation of Tributyltin in San Diego Bay, California, Waters, *Environ. Sci. Technol.*, 20(12):1229-1235.

US Army Corps of Engineers (1981). U.S. Navy Deepening of Pinole Shoal and Mare Island Strait, Solano County, California: Final Environmental Impact Statement, Public Notice 12859-24, US Army Engineer District, San Francisco. Prepared for Commander, Mare Island Naval Shipyard, Vallejo, California.

Valkirs, A.O., Seligman, P.F., Olson, G.J., Brinckman, F.E.., Matthias, C.L., and Bellama, J.M. (1987). Di- and Tributyltin Species in Marine and Estuaries Waters: Interlaboratory Comparison of Two Ultratrace Analytical Methods Employing Hybridization and Atomic Absorption of Flame Photometric Detection, *Analyst*, 112:17-21.

Valkirs, A.O., Seligman, P.F., Stang, P.M., Homer, V., Lieberman, S.H., Vafa, G., and Dooley, C.A. (1986). Measurement of Butylin Compounds in San Diego Bay, *Mar. Poll. Bull.*, 17(17):319-324.

Valkirs, A.O., Seligman, P.F., Vafa, G., Stang, P.M., Homer, V., and Lieberman, S.H. (1985). *Speciation of Butyltins and Methyltins in Seawater and Marine Sediments by Hydride Derivatization and Atomic Absorption Detection.* (NOSC Technical Report 1037) San Diego: Naval Ocean Systems Center.

Virginia Institute of Marine Science (1974). Biological Sampling, Impact Analysis for Long-Range Maintenance Dredging in the Norfolk Naval Complex. Prepared for Arthur D. Little, Inc., Cambridge, MA.

Waldock, M.J., Thain, J., and Miller, D. (1983). The Accumulation and Depuration of bis (Tributyl Tin) Oxide in Oysters: A Comparison Between the Pacific Oyster (Crassostrea gigas) and the European Flat Oyster (Ostrea edulis), ICES CM 1983/E:52, International Council for the Exploration of the Sea, 9 pp.

Walsh, G.E., McLaughlin, L.L., Lores, E.M., Louie, M.K., and Deans, C.H. (1985). Effects of Organotins on Growth and Survival of Two Marine Diatoms, *Skeletonema costatum and Thalassiosira pseudonanan, Chemosphere*, 14(3/4):383-392.

Wenner, E.L., Coon, W.P. III, Shealy, M.H. Jr., and Sandifer, P.A. (1984). *A Five-Year Study of Seasonal Distribution and Abundance of Fishes and Decapod Crustaceans in the Cooper River and Charleston Harbor, S.C., Prior to Diversion.* NOAA Technical Report NMFS SSRF-782, 16pp.

Wong, P.T.S., Chau, Y.K., Kramer, O., and Bengert, G.A., (1982). Structure Toxicity Relationship of Tin Compounds on Algae, *Can. J. Fish Aquat. Sci.*, 39:483-488.

Young, D.R., Alexander, G.V., and McDermott-Ehrlich, D. (1979). Vessel-Related Contamination of Southern California Harbors by Copper and Other Metals. *Marine Pollution Bulletin*, 10(2):50-56.

Zuckerman, J.J., Reisdorf, R.P., Ellis, H.V. III, and Wilkinson, R.R. (1978). *Organotins in Biology and the Environment, in: Organometals and Organometalloids -- Occurrence and Fate in the Environment* (Brinckman, F.E., and Bellama, J.M. eds), Amer. Chem. Soc. Washington, D.C. Symposium Series 82, pp 388-424.

APPENDIX A

TIN CONCENTRATION FIGURES FOR EACH HARBOR SYSTEM

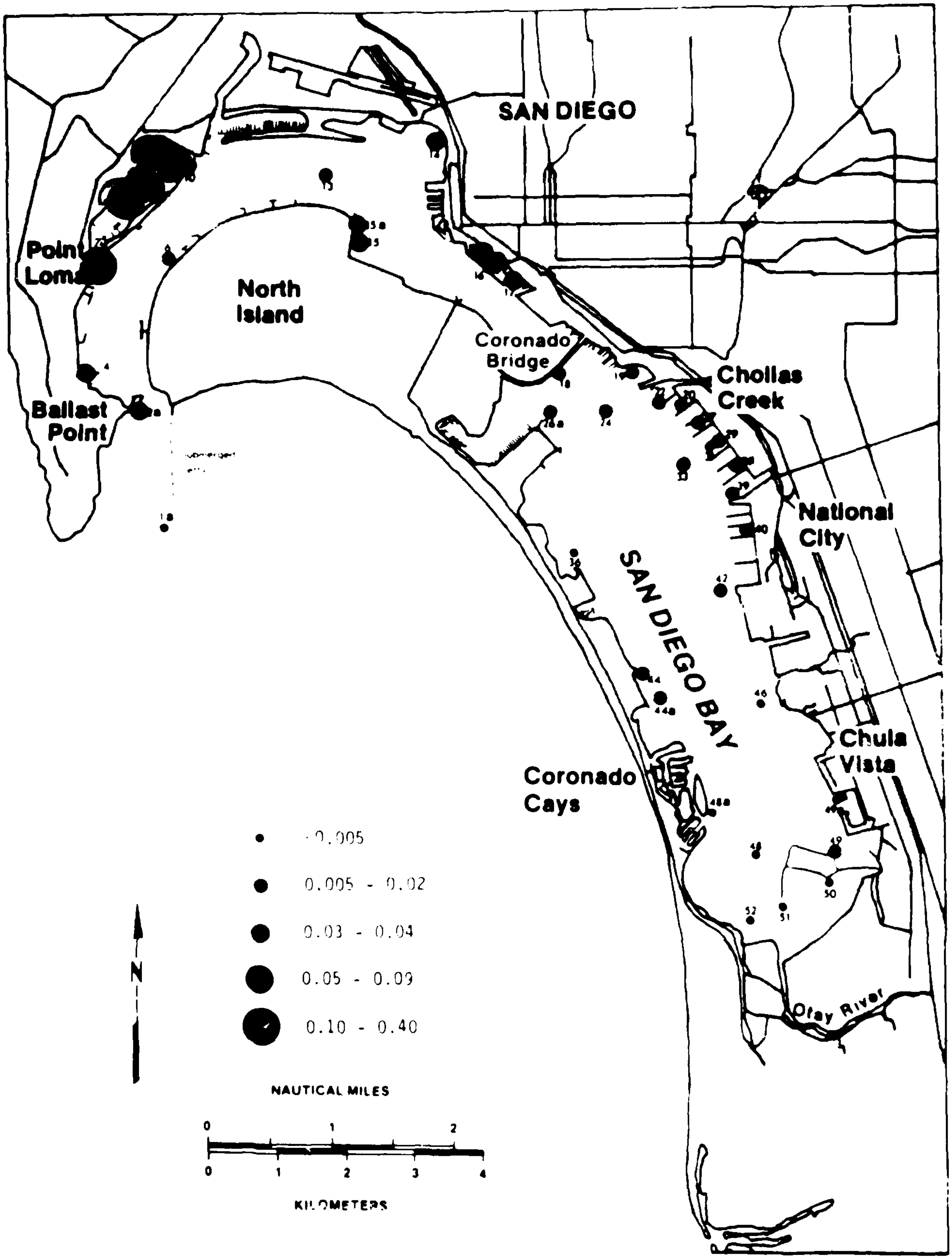


Figure A-1 Water tributyltin content San Diego Bay

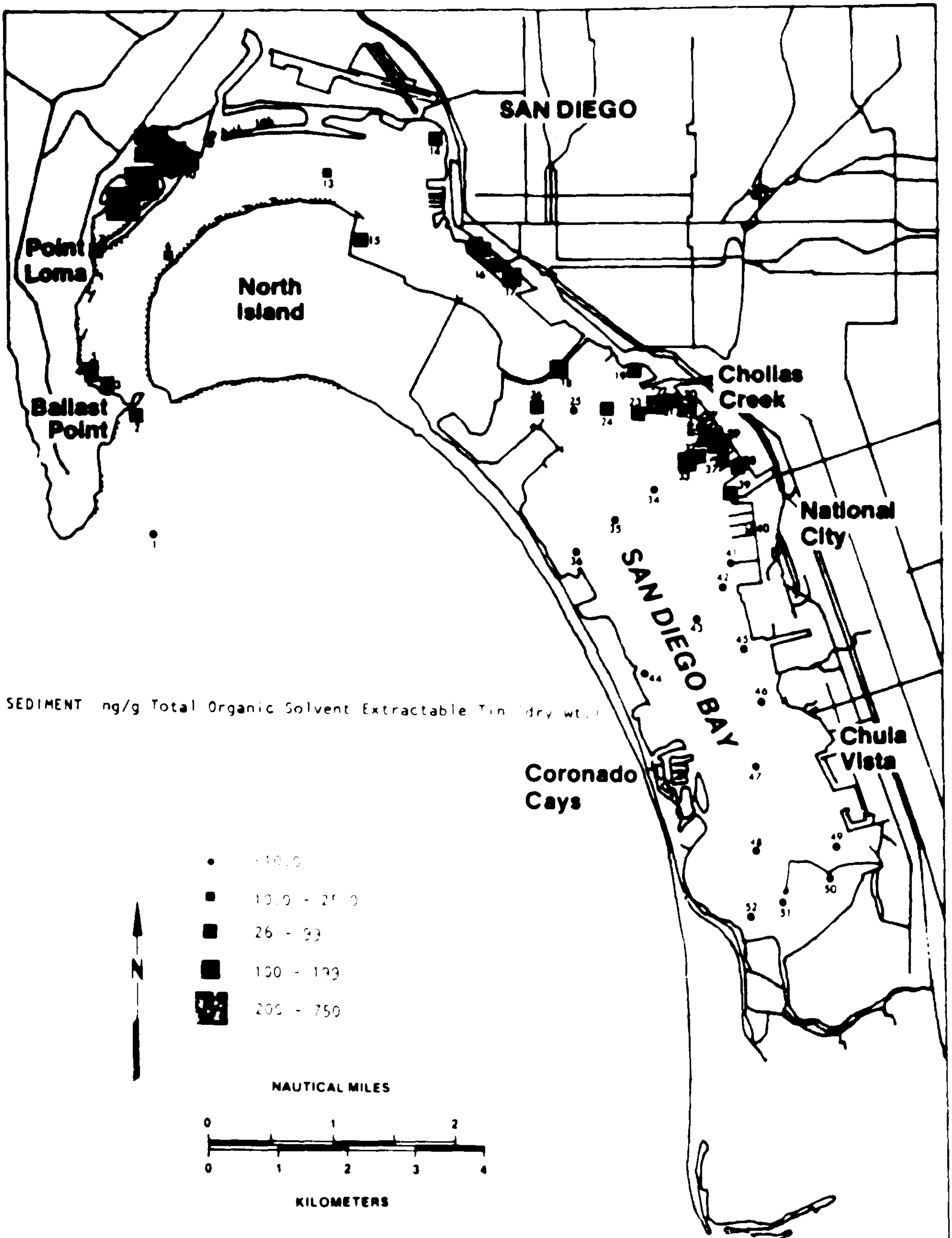


Figure A-2 Sediment organic solvent extractable tin concentrations, San Diego Bay

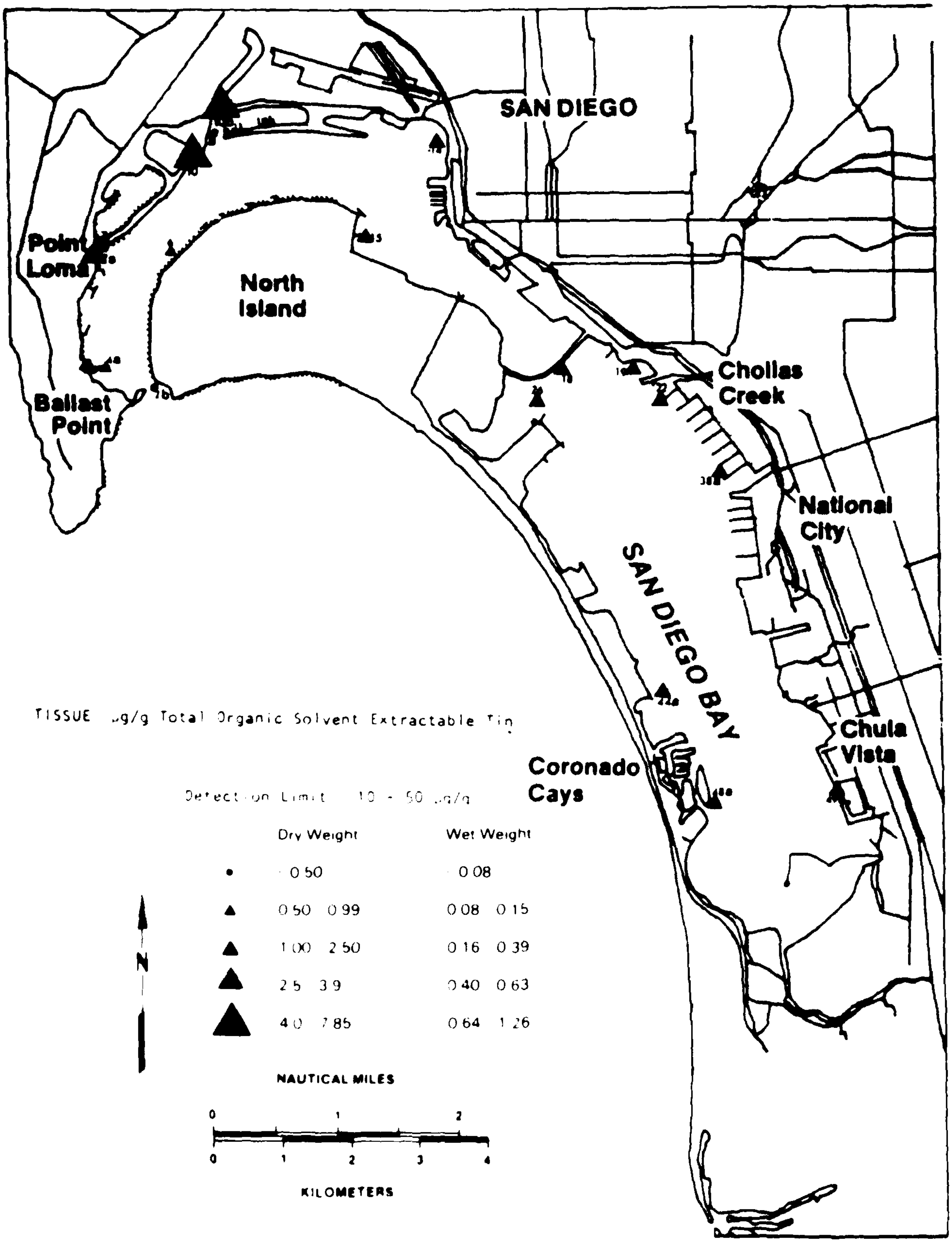


Figure A 3 Tissue organic solvent extractable tin concentrations San Diego Bay

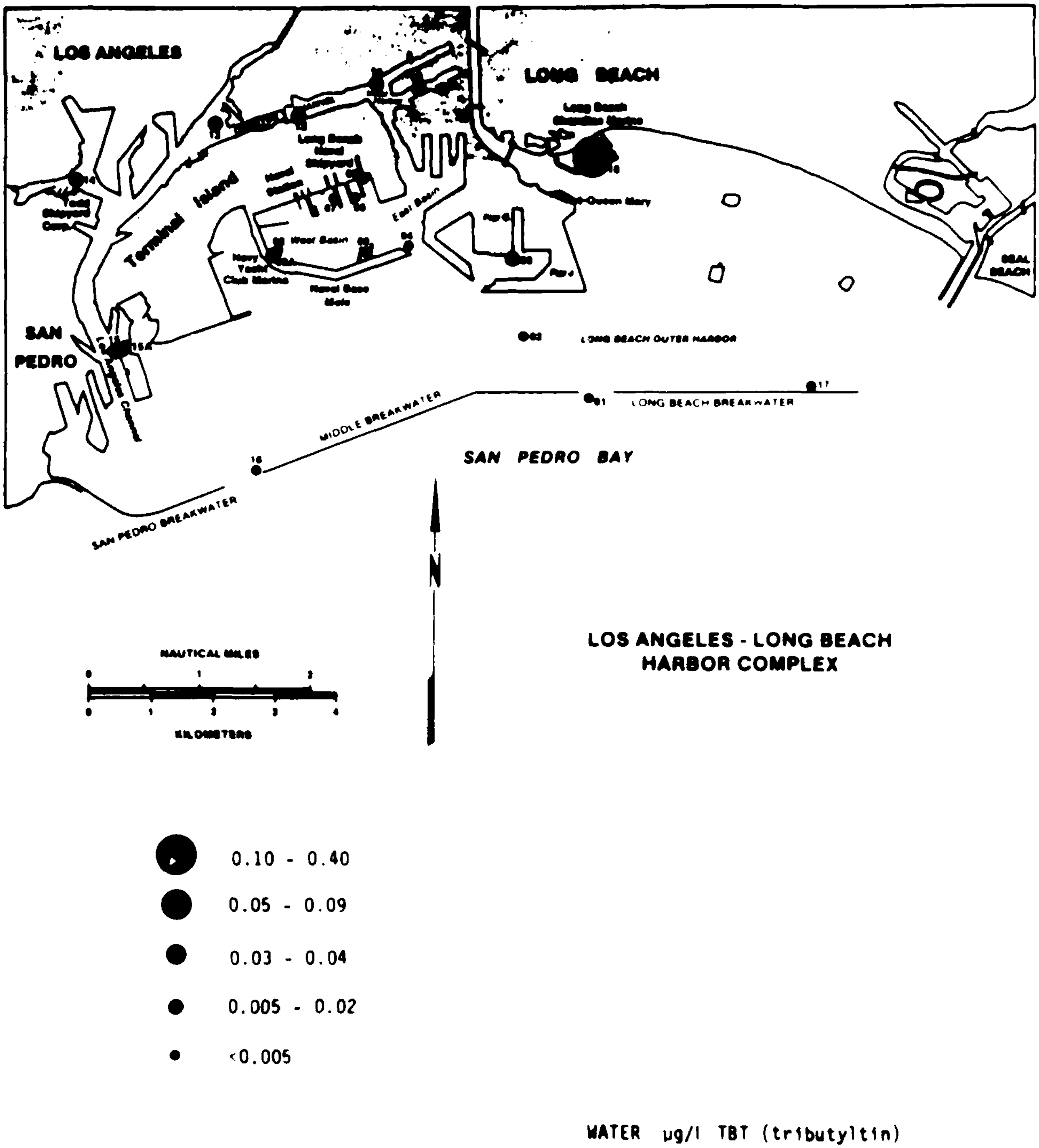


Figure A-4 Water tributyltin content Los Angeles Long Beach Harbor

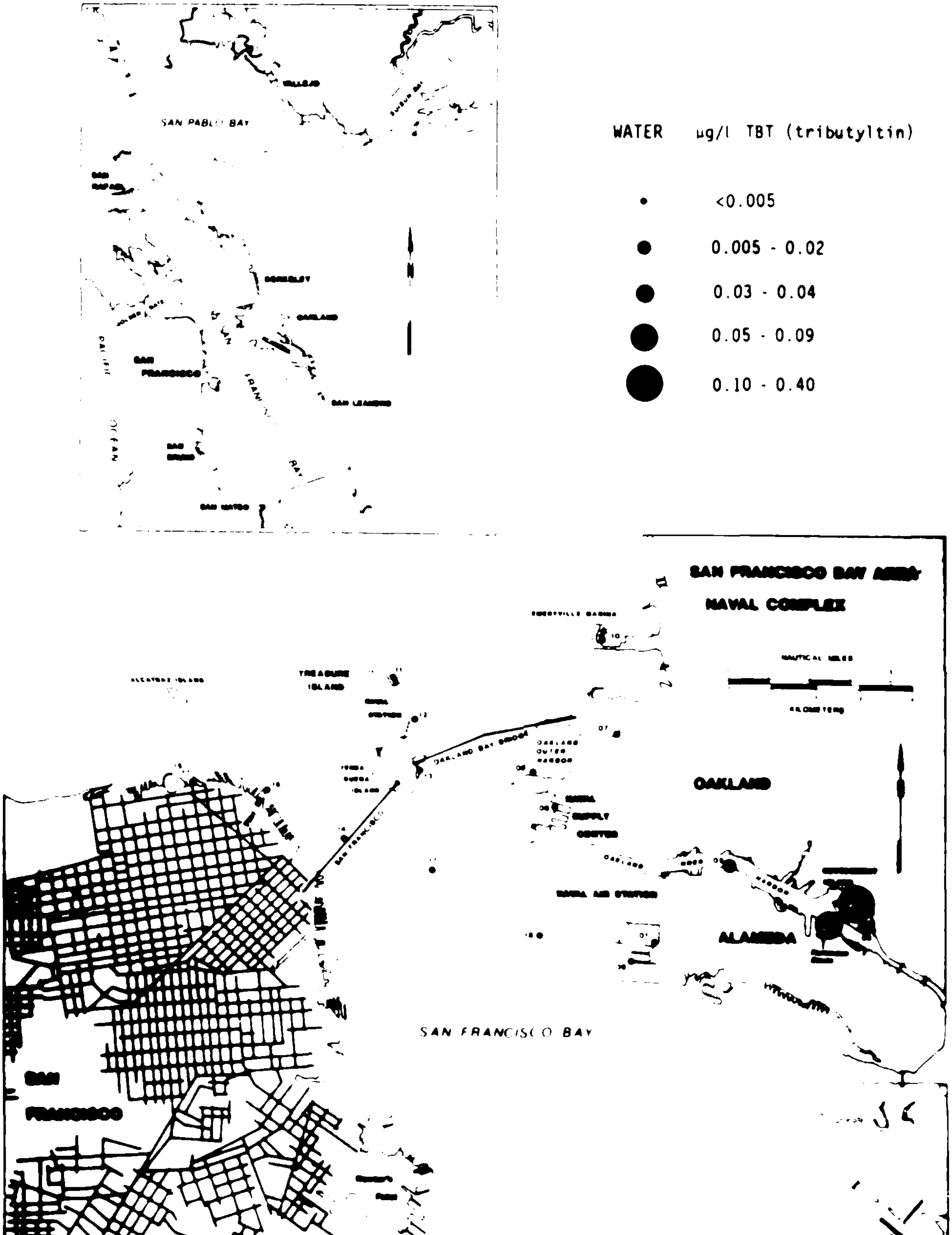


Figure A 5 Water tributyltin content San Francisco Bay

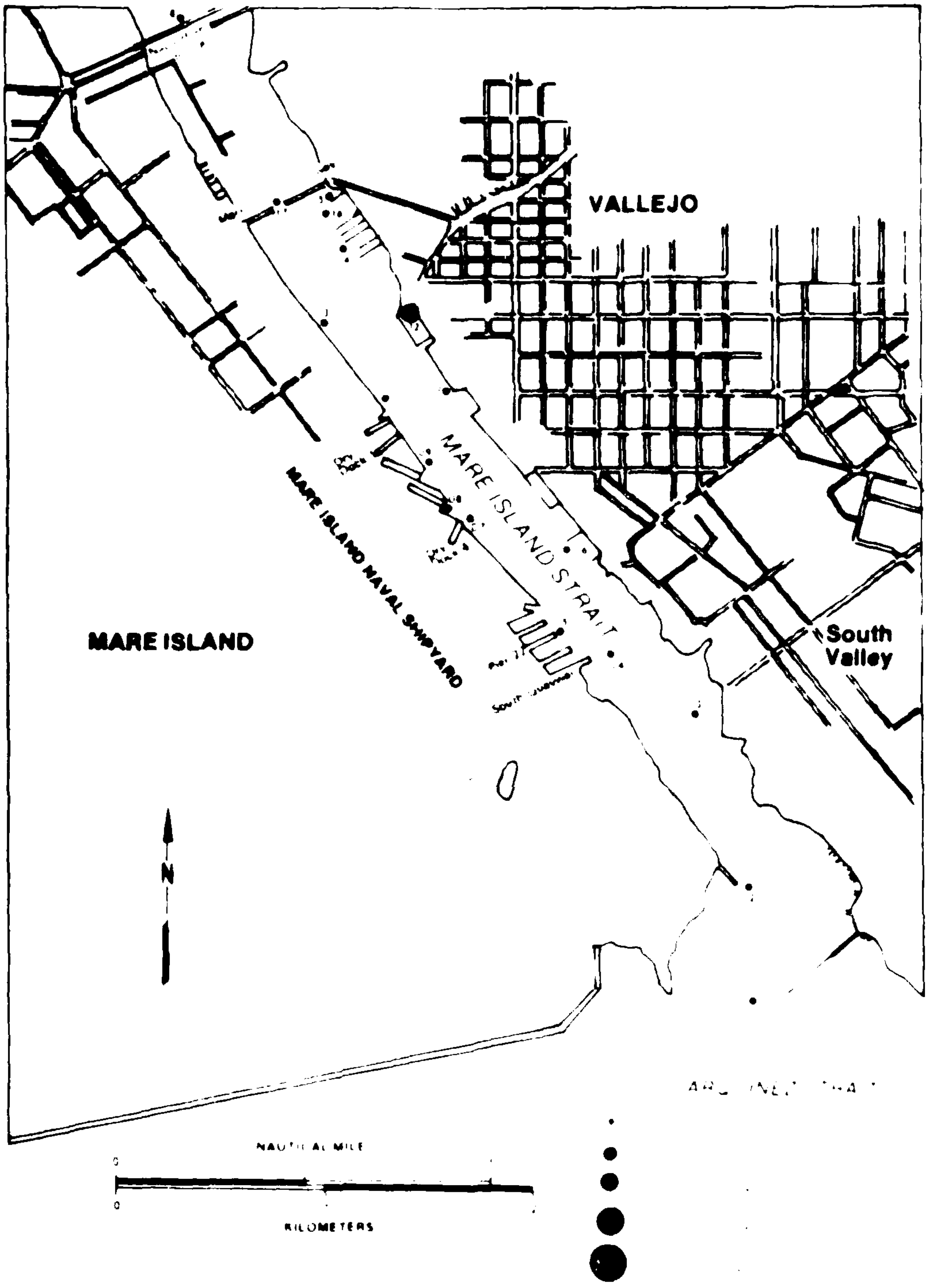


Figure A 6 Water tributyltin content Mare Island Strait

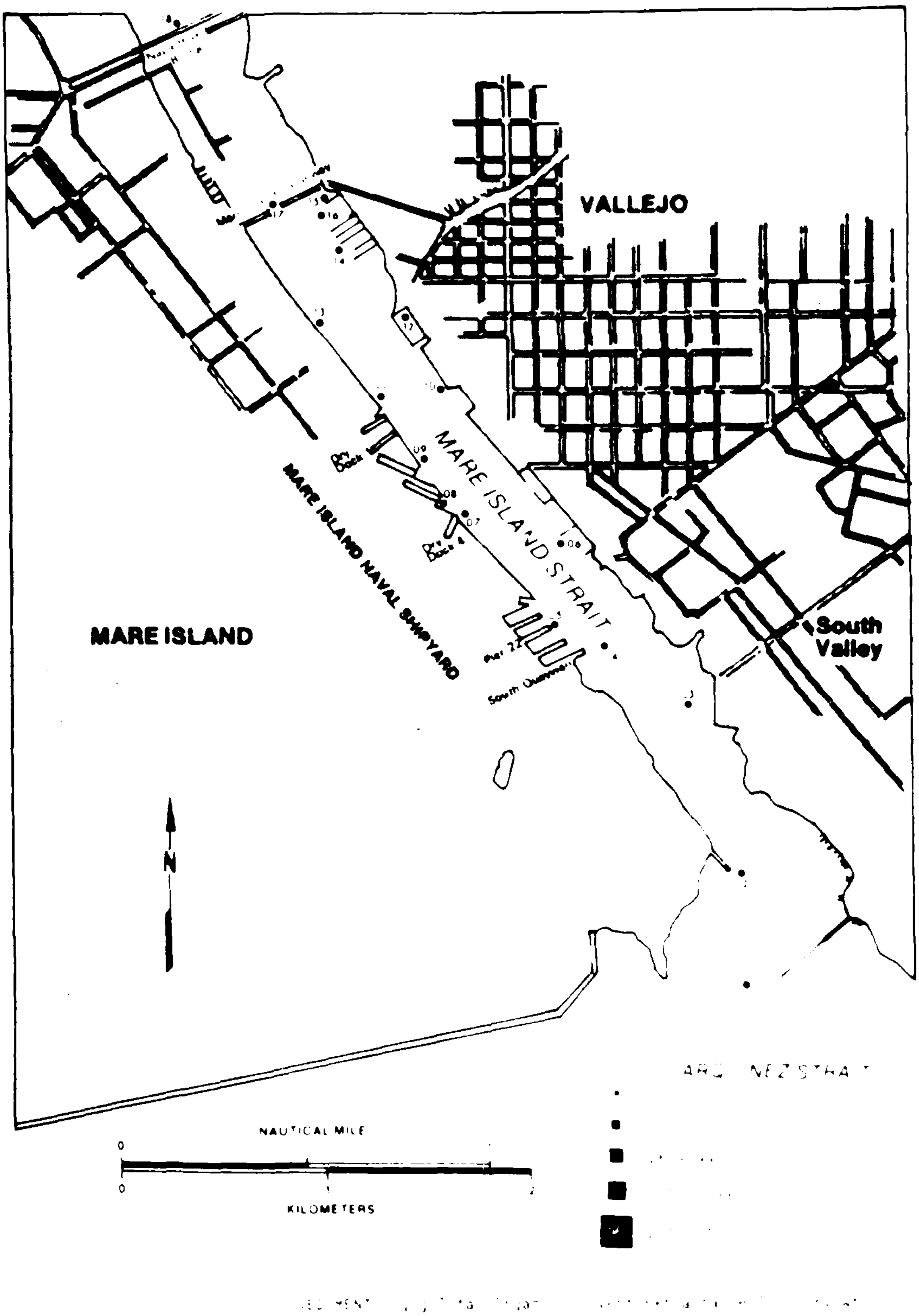
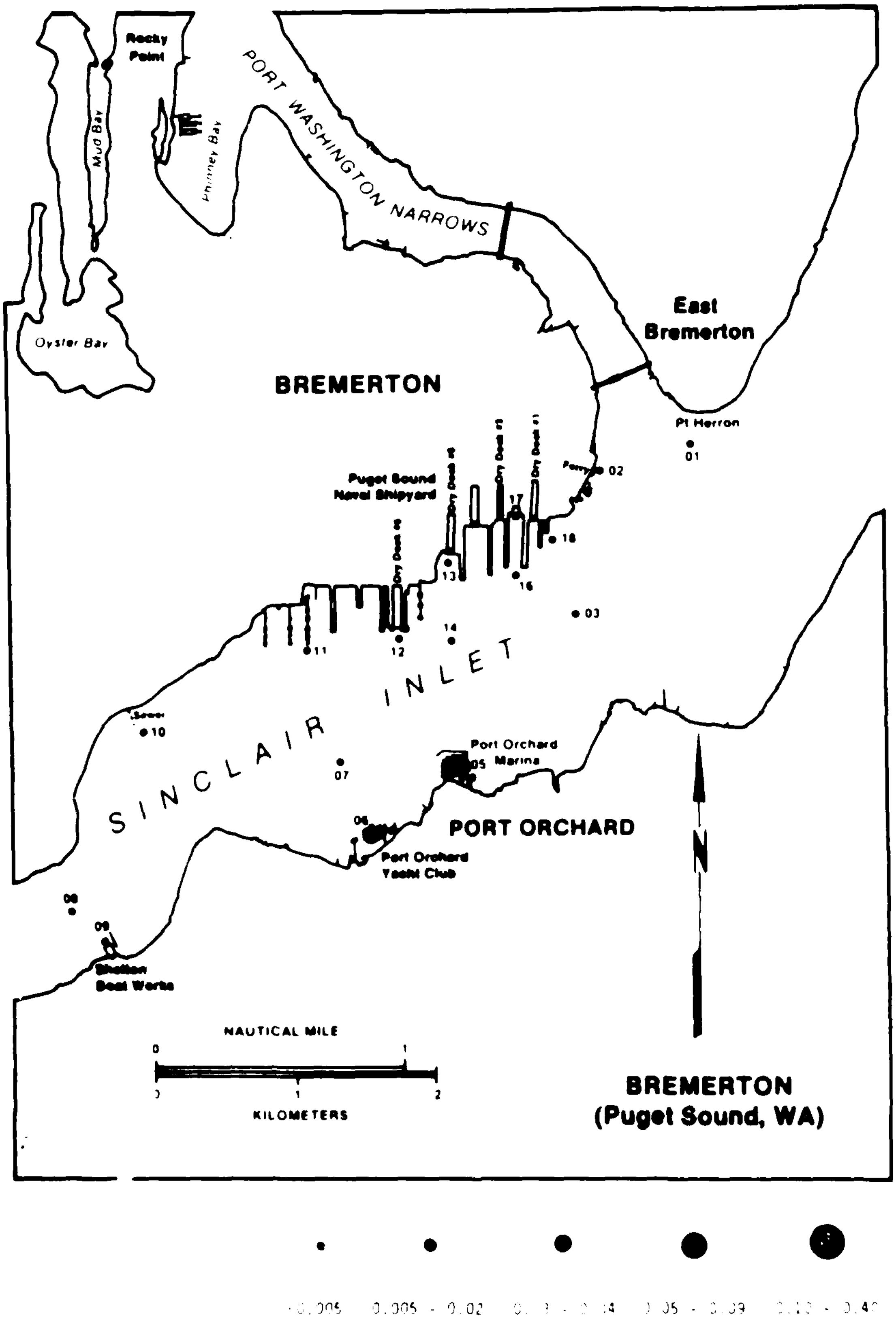


Figure A 7 Sediment organic solvent extractable tin concentrations Mare Island Strait



WATER µg/l TBT (tributyltin)

Figure A 8 Water tributyltin content Bremerton (Sinclair Inlet)

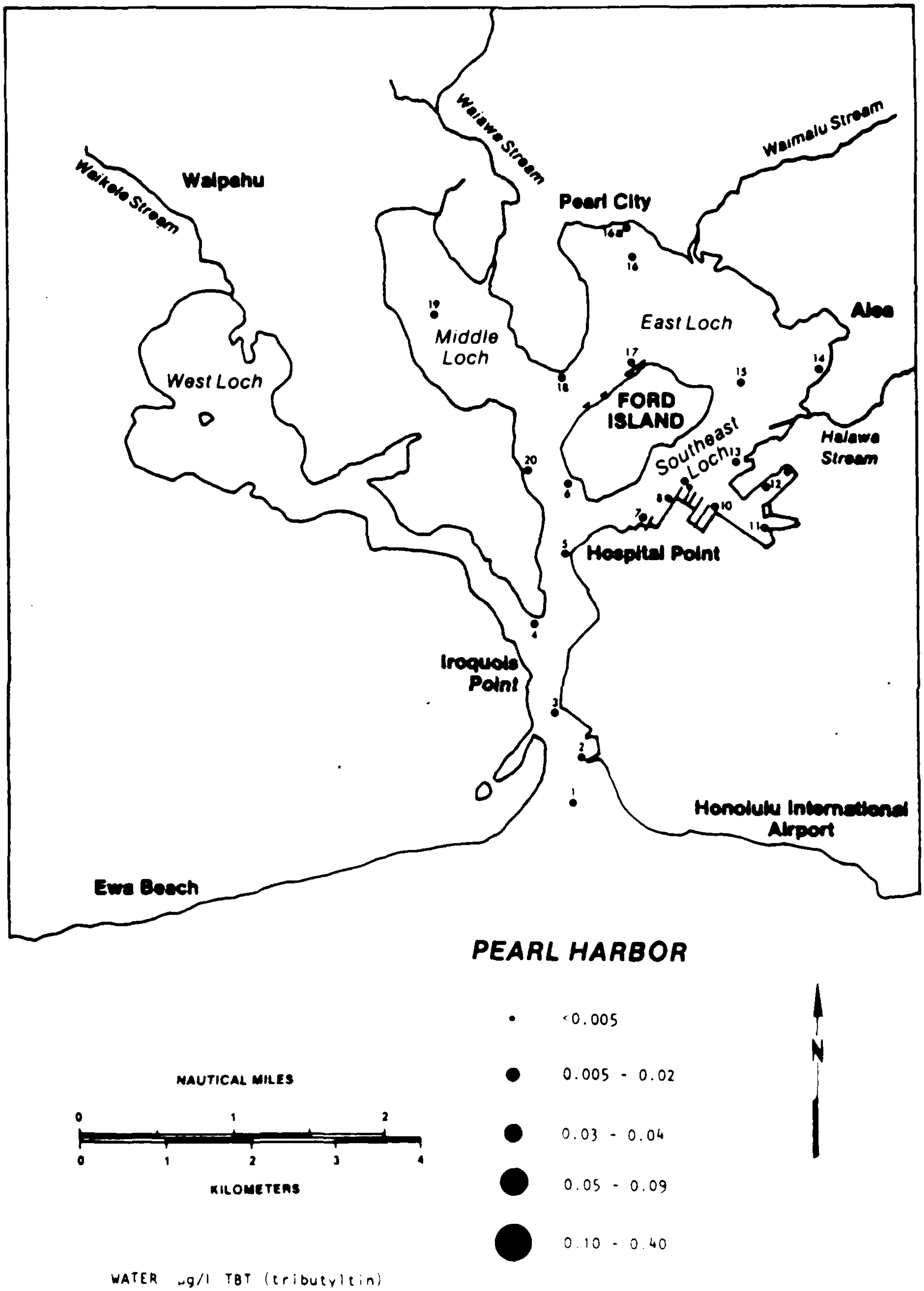
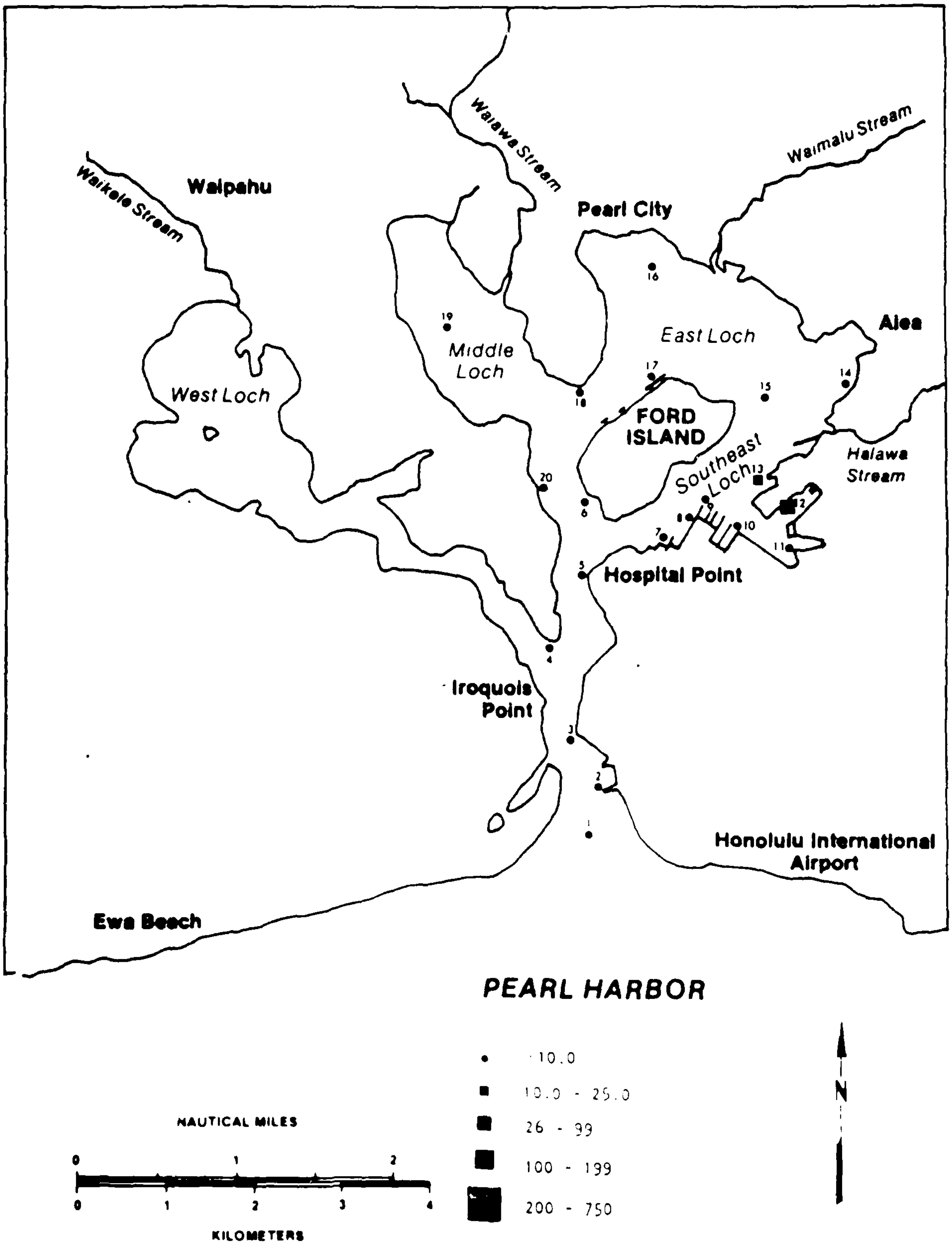
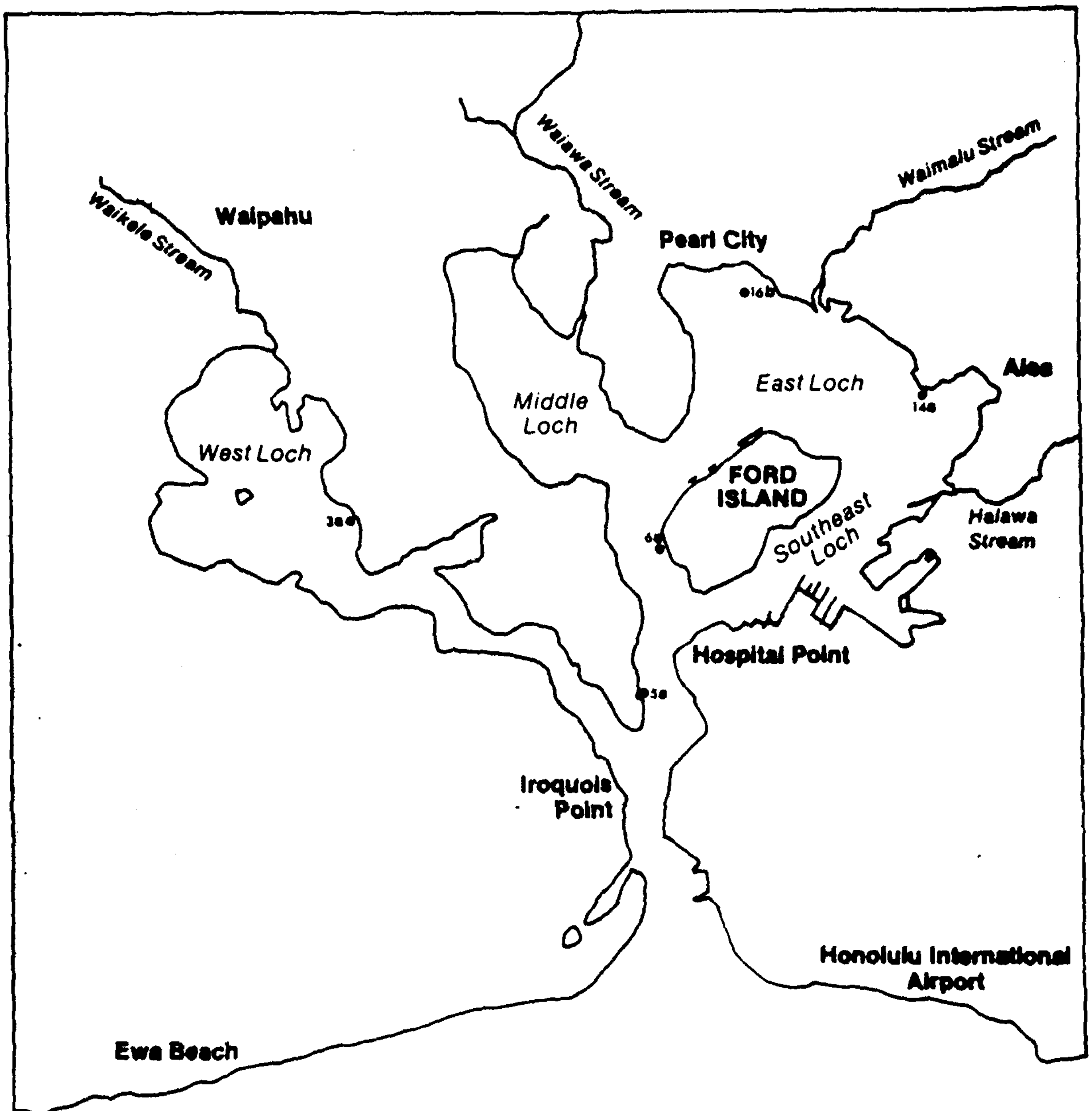


Figure A 9 Water tributyltin content Pearl Harbor



SEDIMENT ng/g Total Organic Solvent Extractable Tin (dry wt.)

Figure A-10 Sediment organic solvent extractable tin concentrations Pearl Harbor



PEARL HARBOR

TISSUE µg/g Total Organic Solvent Extractable Tin

Detection Limit: 10 - 50 µg/g

NAUTICAL MILES 0 1 2

KILOMETERS 0 1 2 3 4

	Dry Weight	Wet Weight
•	<0.50	<0.08
▲	0.50 - 0.99	0.08 - 0.15
▲	1.00 - 2.50	0.16 - 0.39
▲	2.5 - 3.9	0.40 - 0.63
▲	4.0 7.85	0.64 - 1.26

N

... solvent extractable tin concentrations: Pearl Harbor.

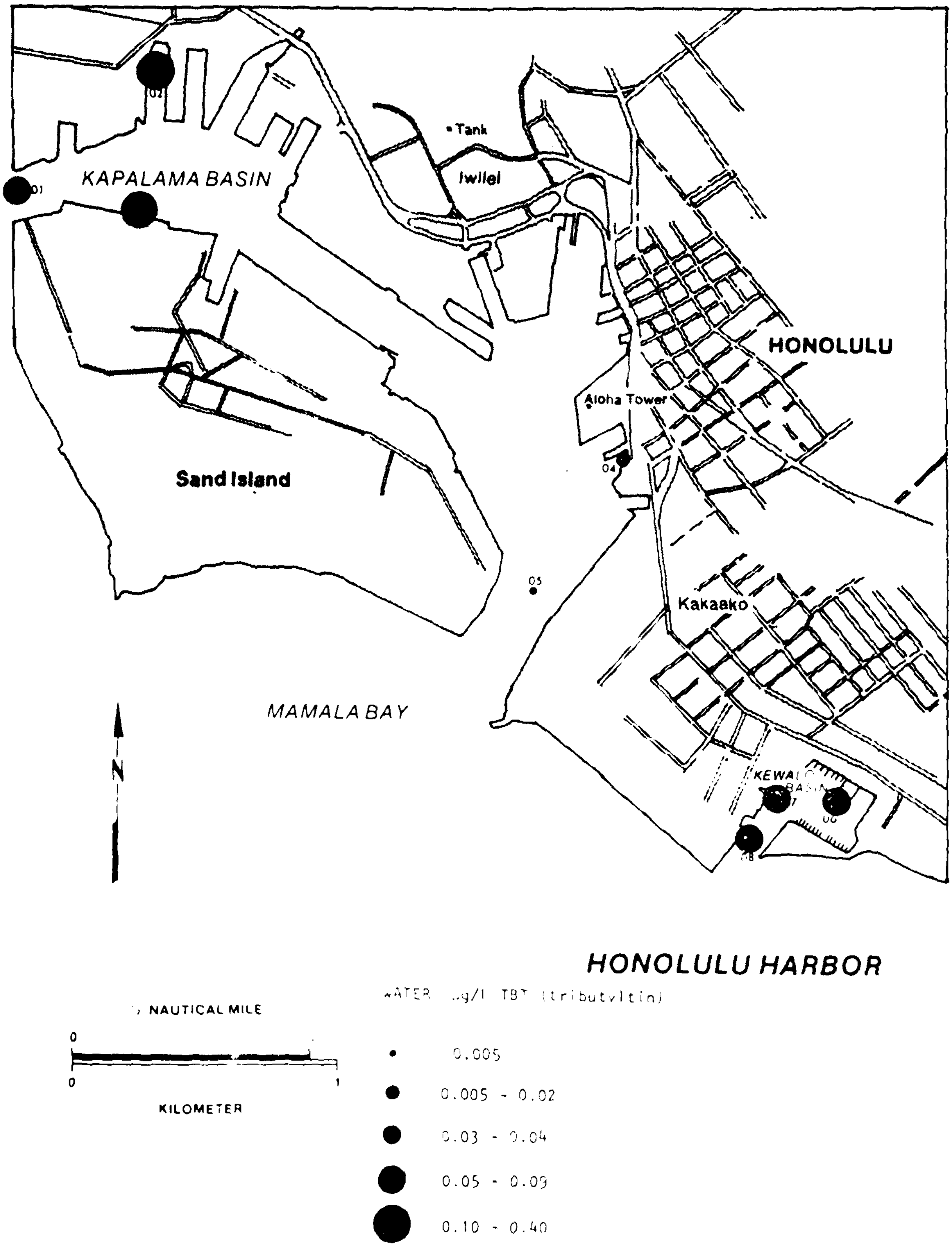
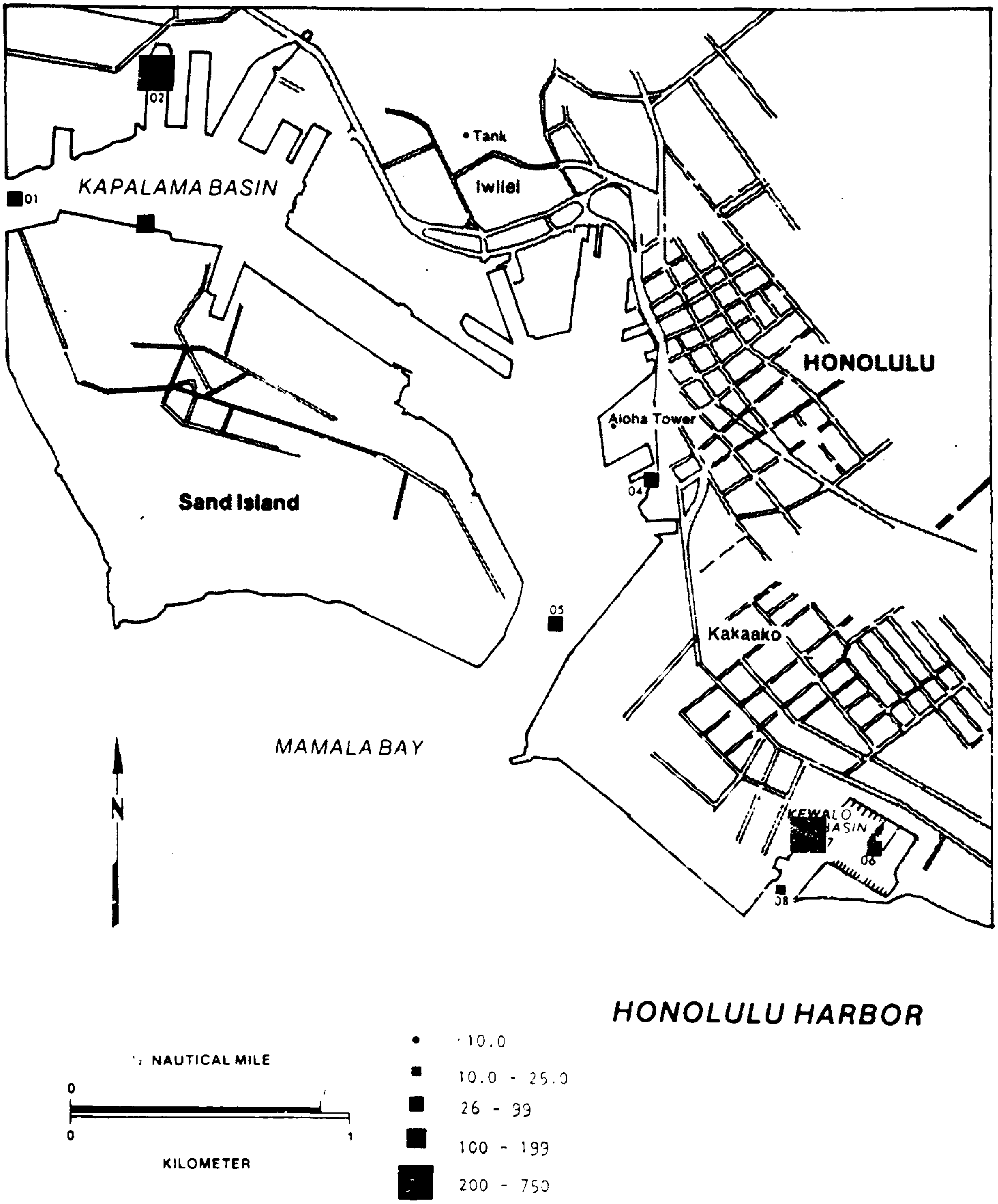


Figure A-12. Water tributyltin content Honolulu Harbor and Kewalo Basin



SEDIMENT ng/g Total Organic Solvent Extractable Tin (dry wt.)

Figure A-13. Sediment organic solvent extractable tin concentrations. Honolulu Harbor and Kewalo Basin

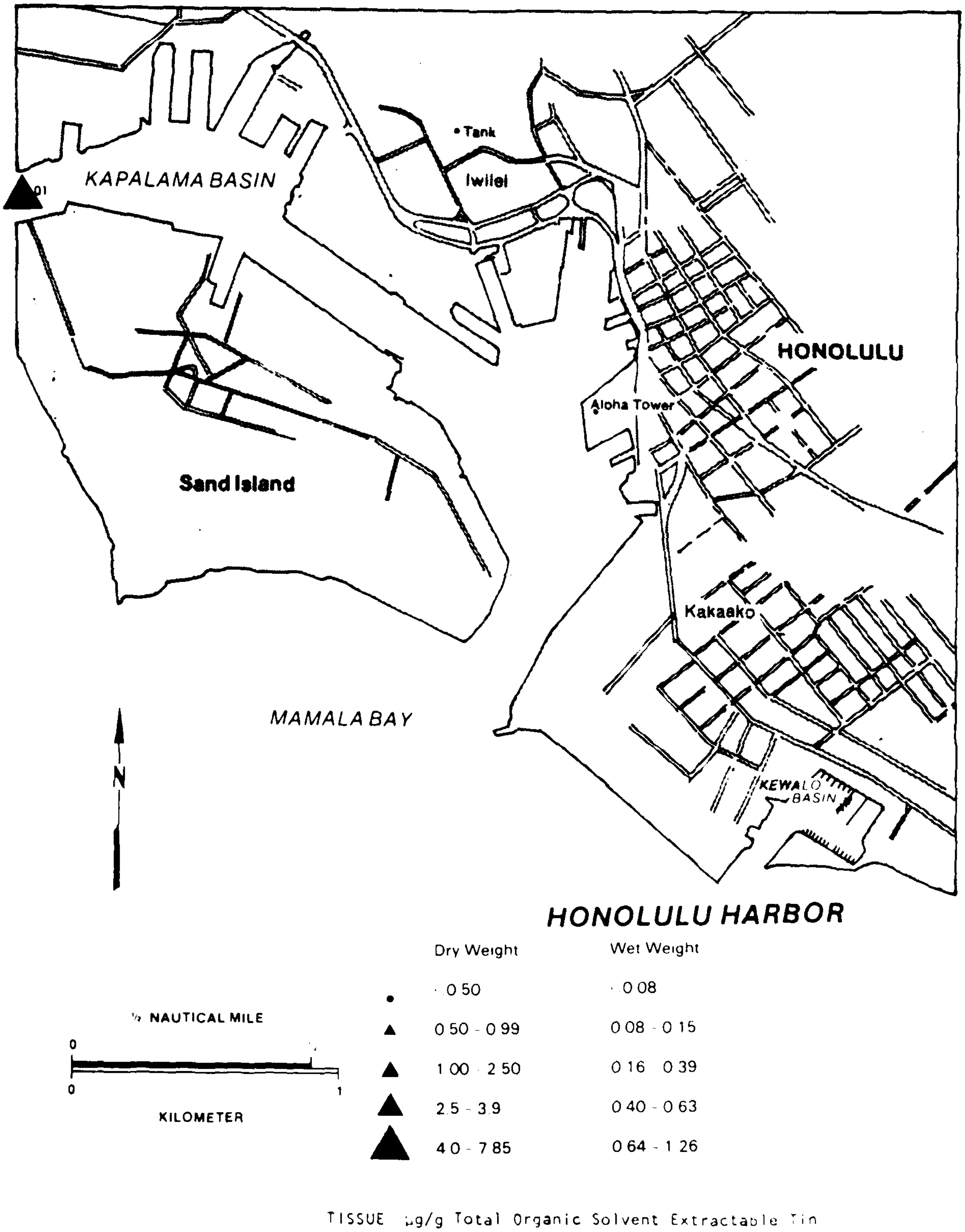
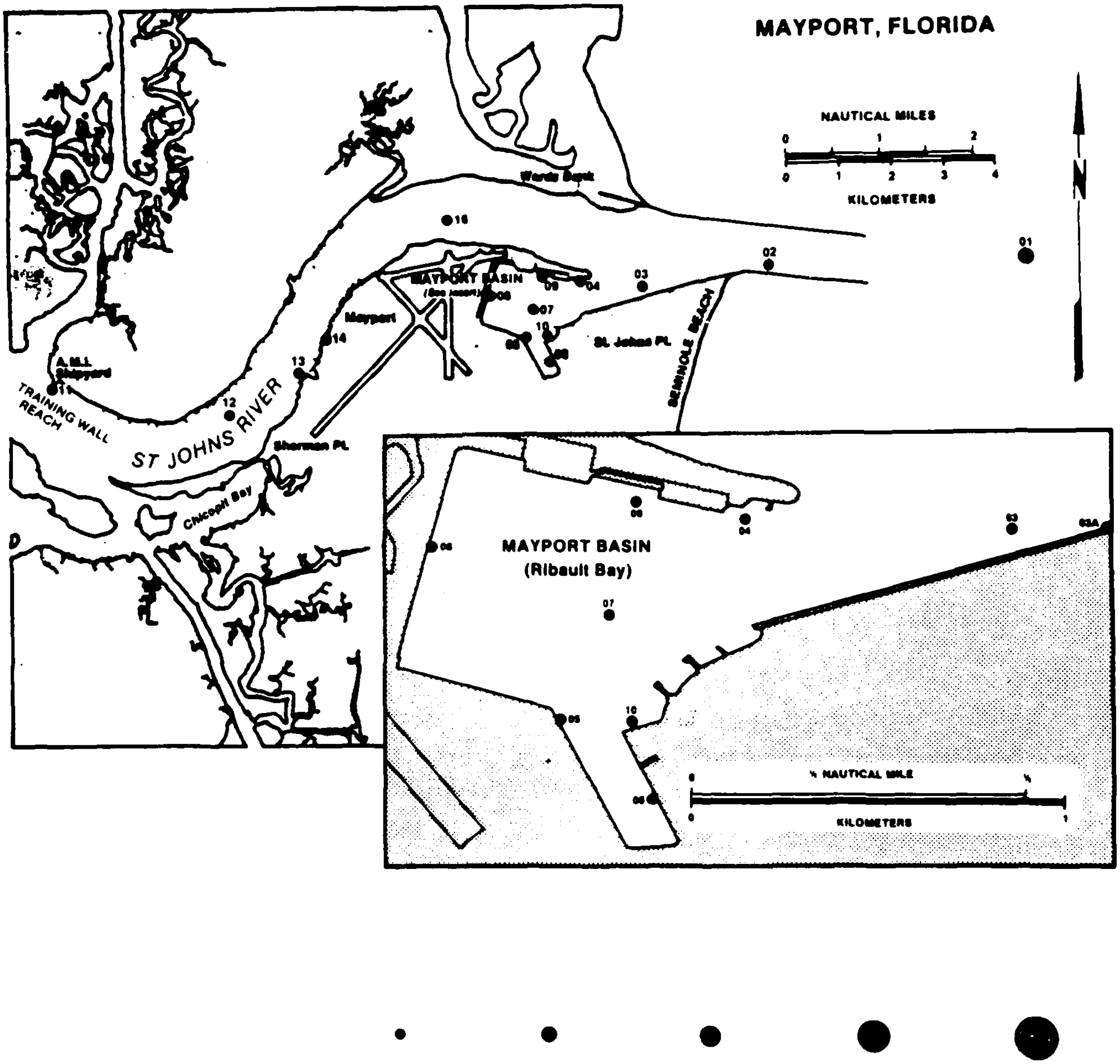


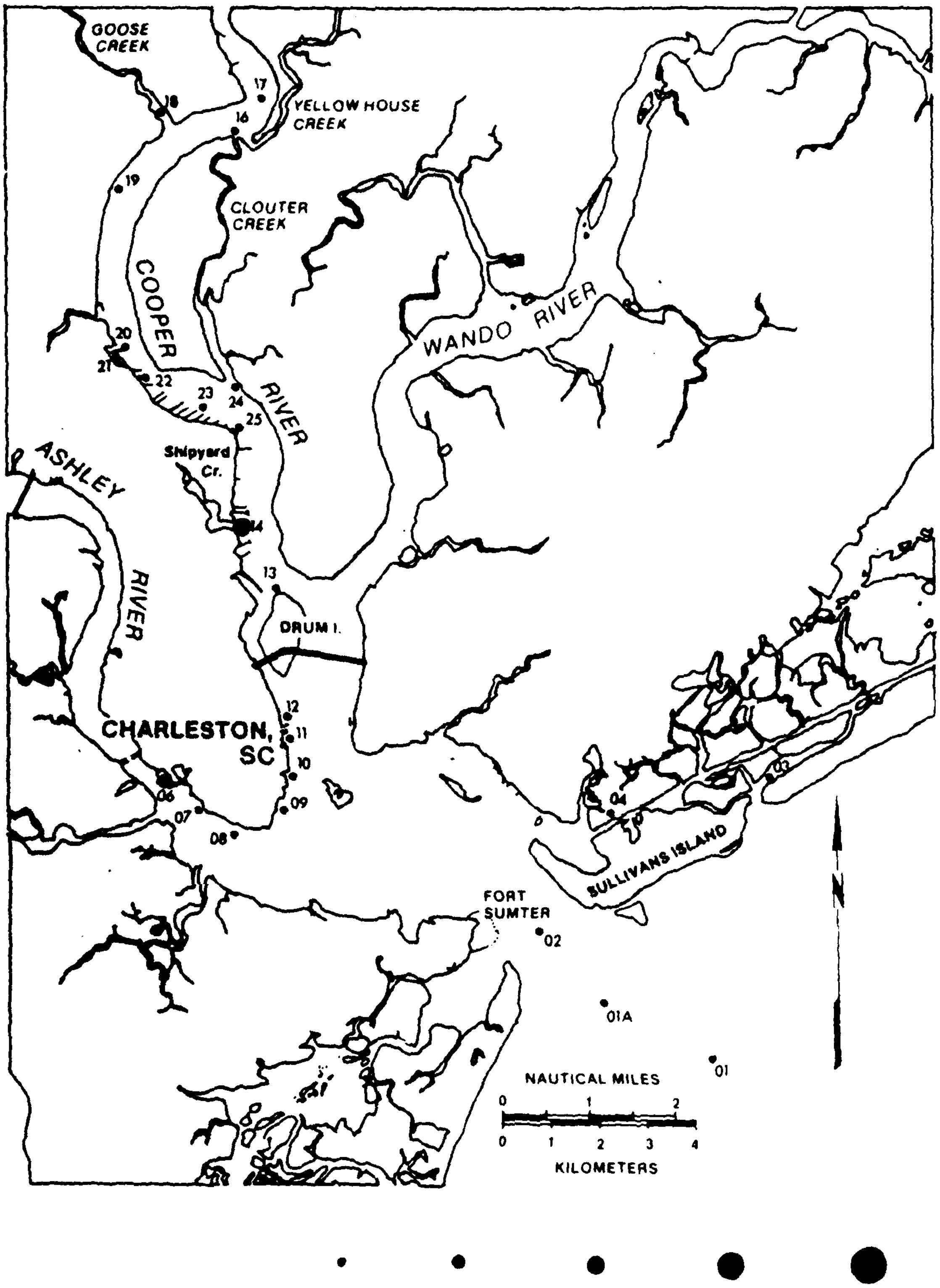
Figure A-14. Tissue organic solvent extractable tin concentrations Honolulu Harbor and Kewalo Basin



<0.005 0.005 - 0.02 0.03 - 0.04 0.05 - 0.09 0.10 - 0.40

WATER µg/l TBT (tributyltin)

Figure A-15. Water tributyltin content: Mayport Basin/St John's River



<0.005 0.005 - 0.02 0.03 - 0.04 0.05 - 0.09 0.10 - 0.40

WATER µg/l TBT (tributyltin)

Figure A-16. Water tributyltin content: Charleston Harbor

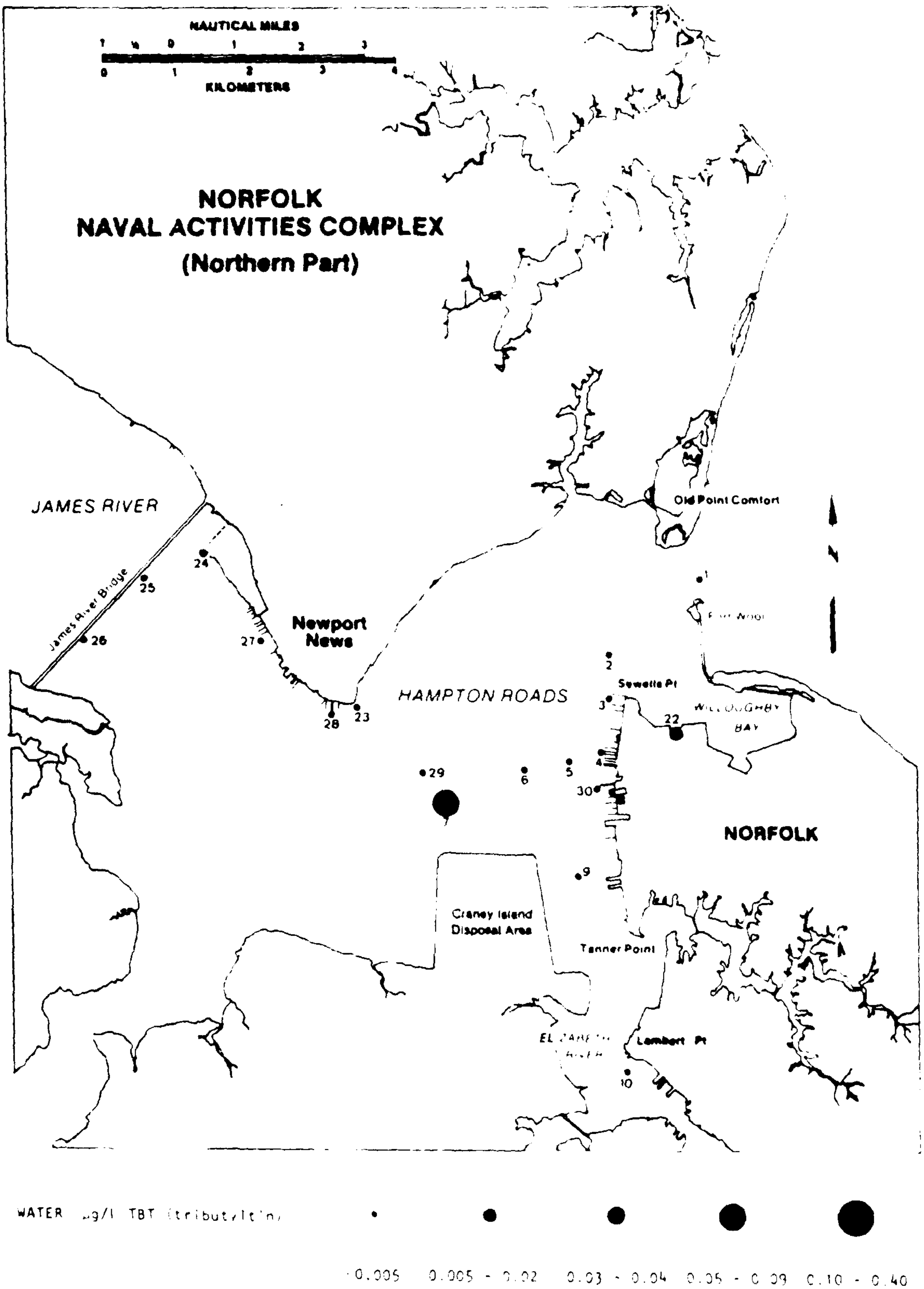


Figure A-17 Water tributyltin content Norfolk Harbor Complex (northern part)

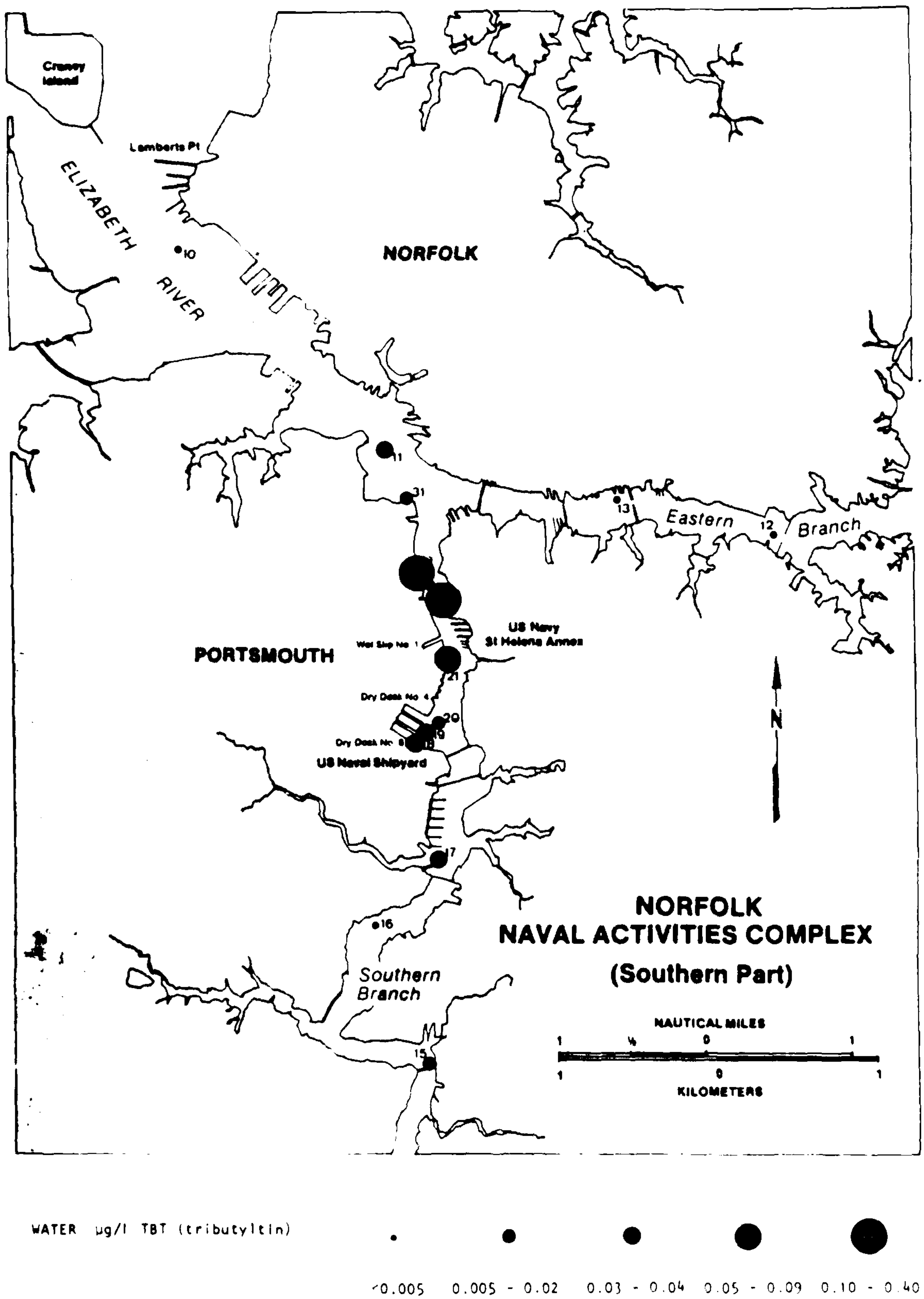
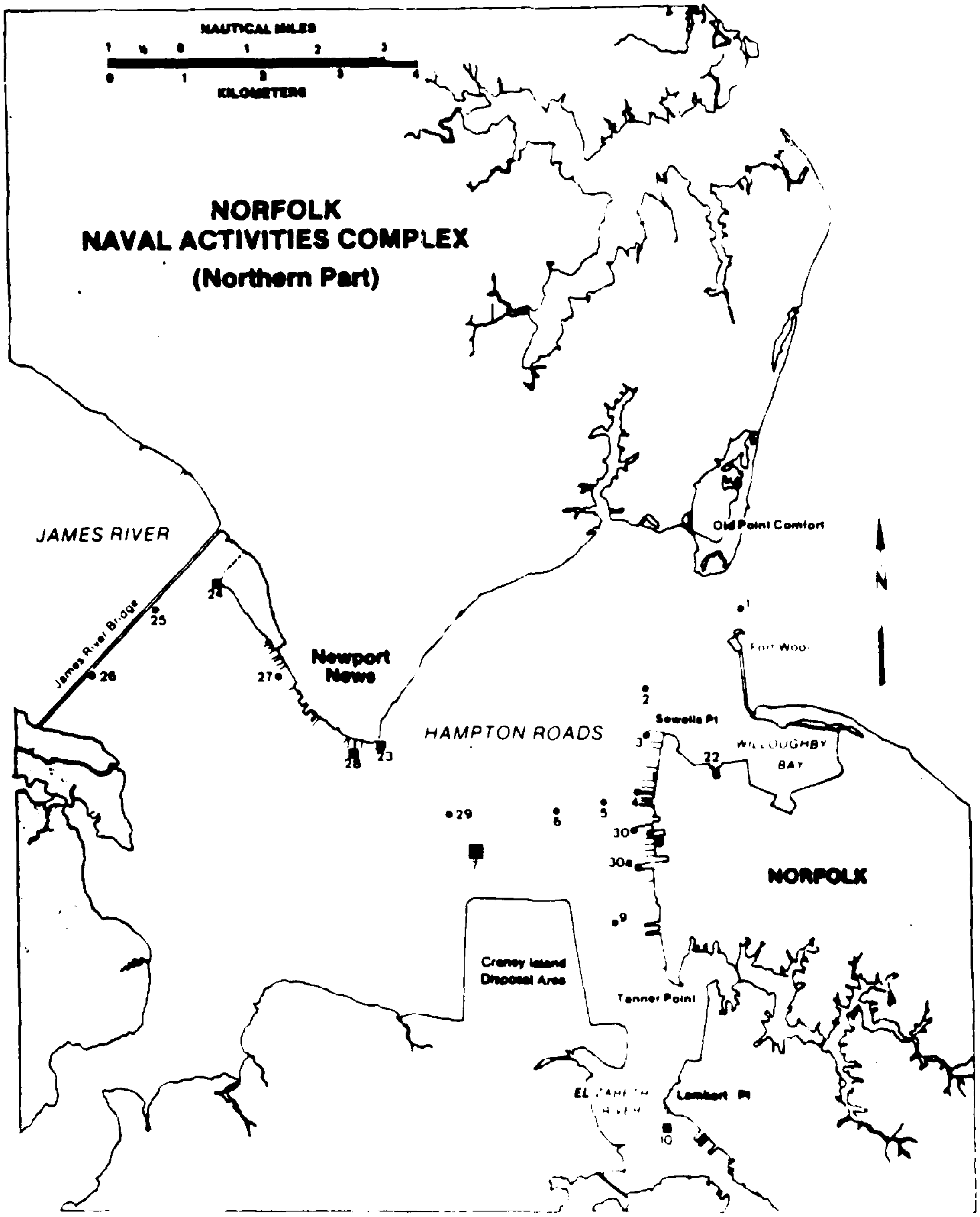


Figure A-18 Water tributyltin content Norfolk Harbor Complex (southern part)



SEDIMENT ng/g Total Organic Solvent Extractable Tin (dry wt.)

<10.0 10.0 - 25.0 26 - 99 100 - 199 200 - 750

Figure A-19 Sediment organic solvent extractable tin concentrations Norfolk Harbor Complex (northern part)

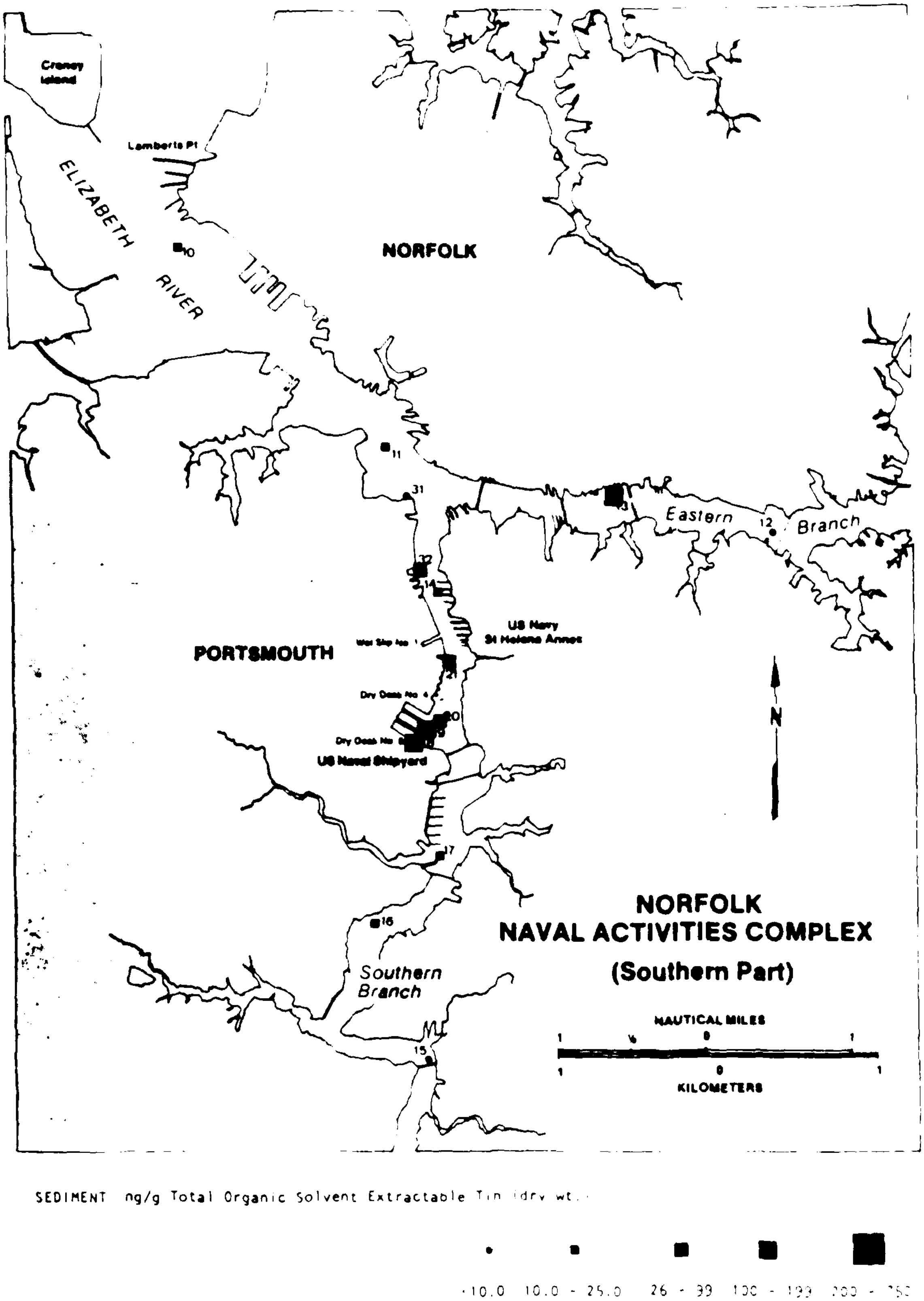
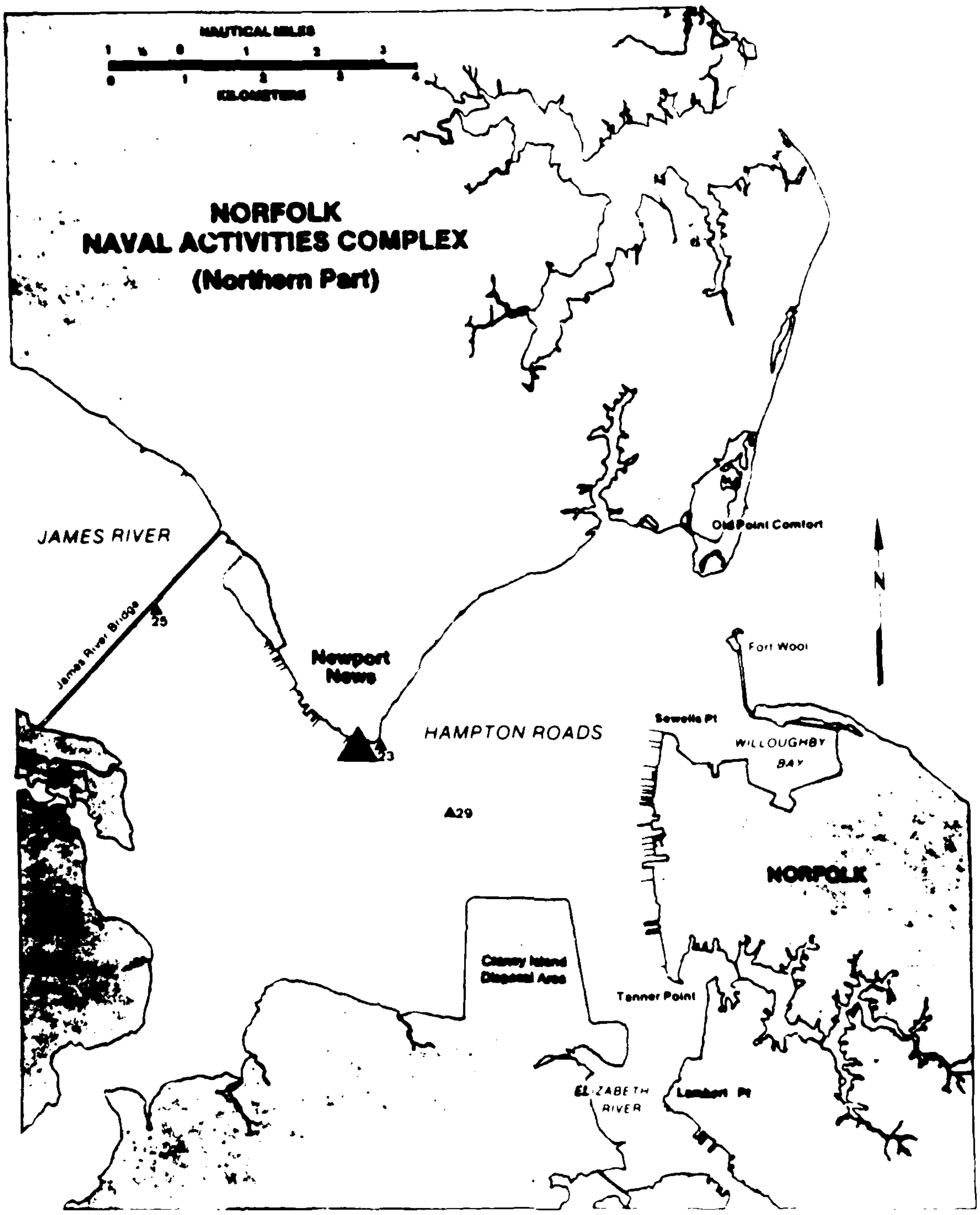


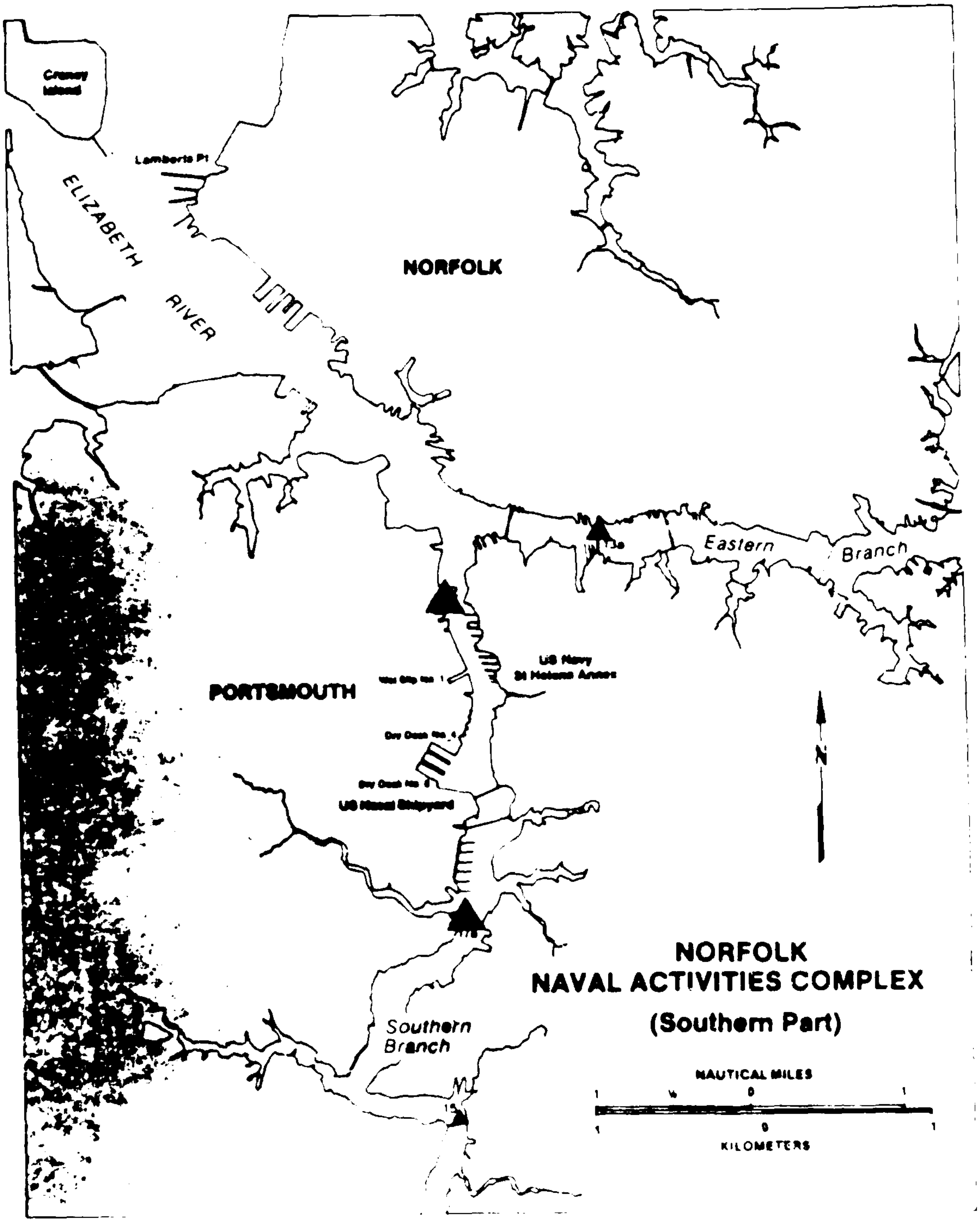
Figure A-20. Sediment organic solvent extractable tin concentations Norfolk Harbor Complex (sourthern part).



TISSUE µg/g Total Organic Solvent Extractable Tin

	•	▲	▲	▲	▲
Dry Weight	0 50	0 50 0 99	1 00 2 50	2 5 3 9	4 0 7 85
Wet Weight	0 08	0 08 0 15	0 16 0 39	0 40 0 63	0 64 1 26

Figure A 21 Tissue organic solvent extractable tin concentrations Norfolk Harbor Complex (northern part)



TISSUE µg/g Total Organic Solvent Extractable Tin

	•	▲	▲	▲	▲
Dry Weight	0 50	0 50 0 99	1 [illegible] 2 50	2 5 3 [illegible]	4 [illegible] 8[illegible]
Wet Weight	0 08	0 08 0 15	[illegible] 0 39	0 40 0 63	[illegible]

Figure A-22 Tissue organic solvent extractable tin concentrations Norfolk Harbor Complex (southern part)

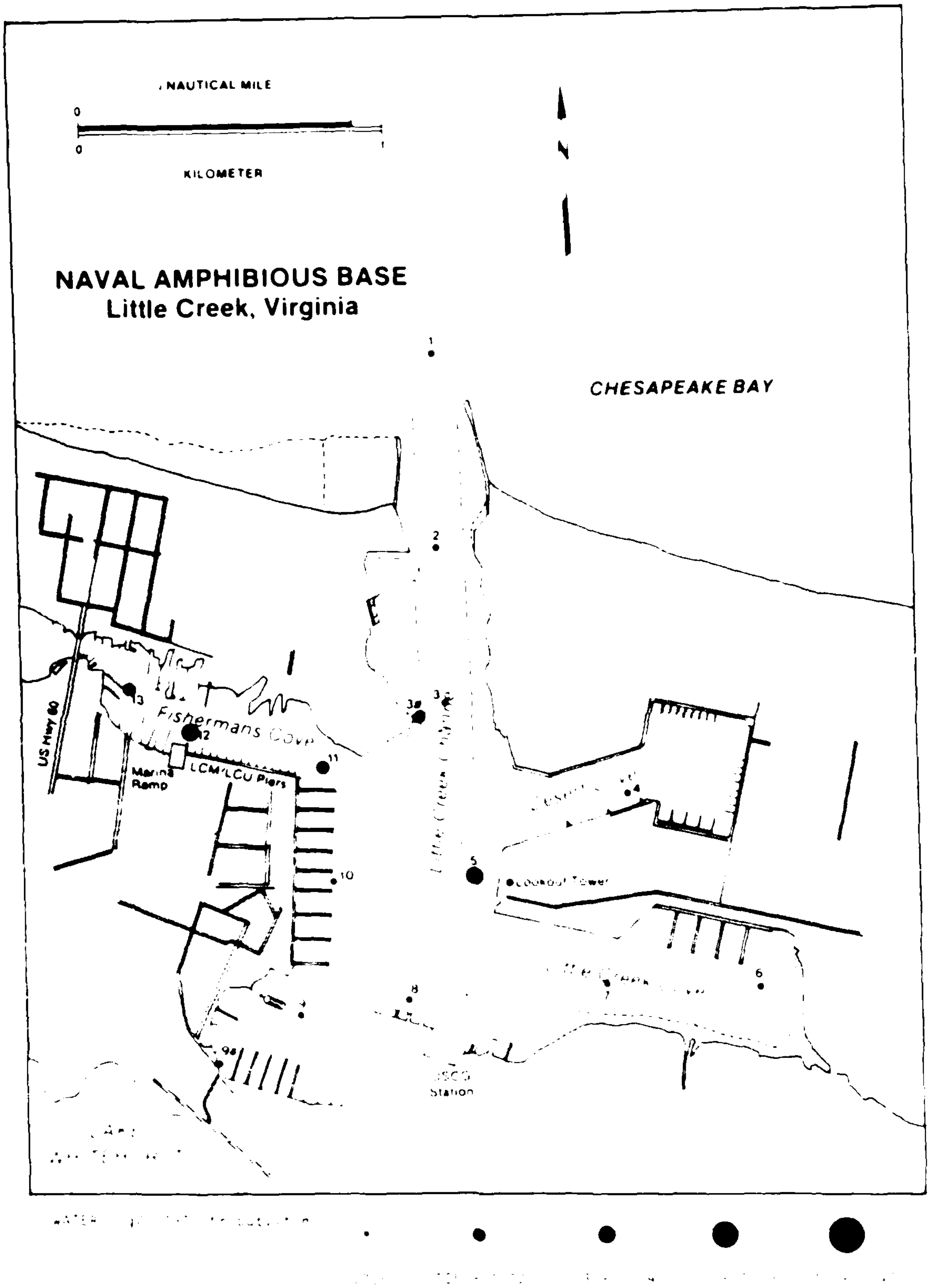
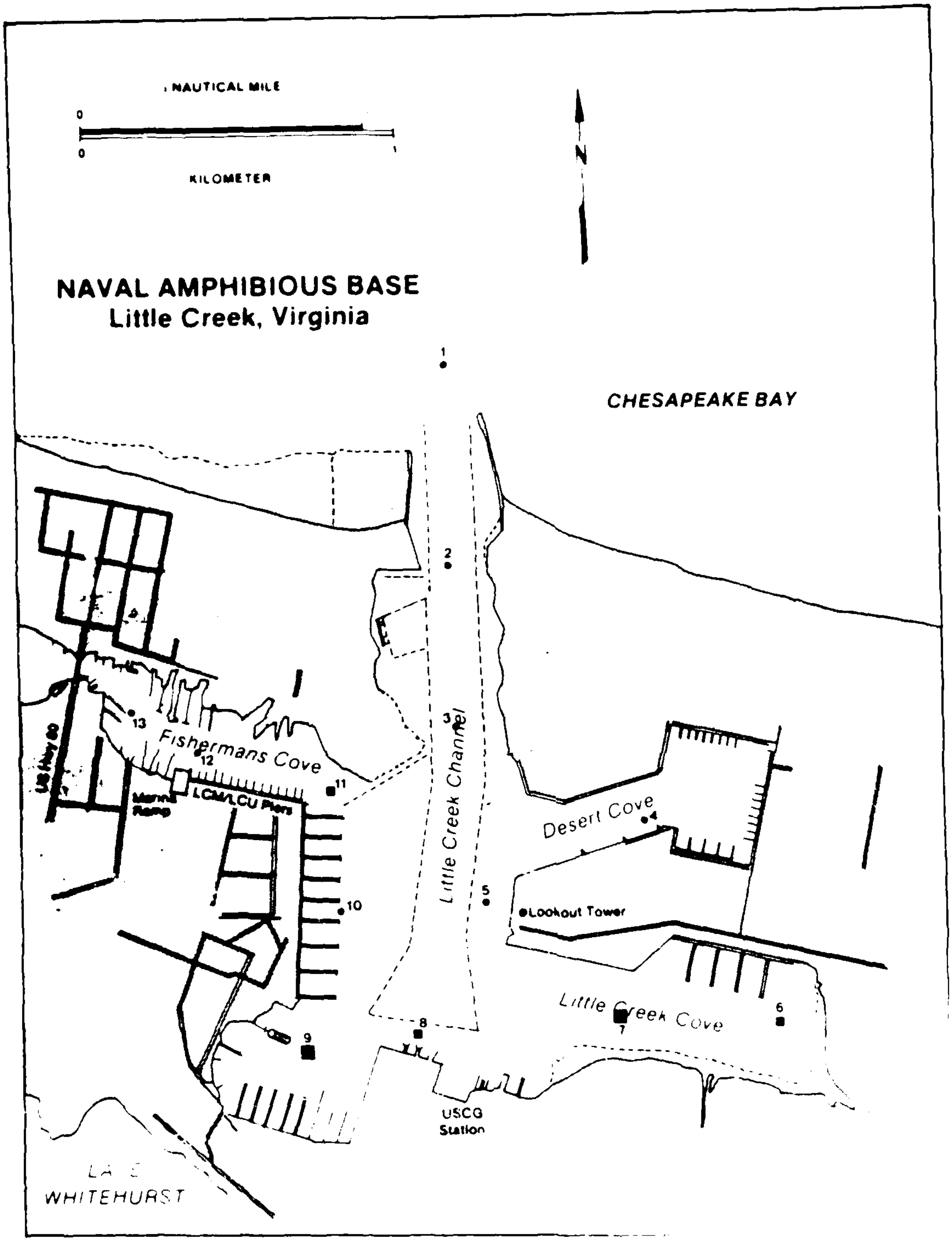


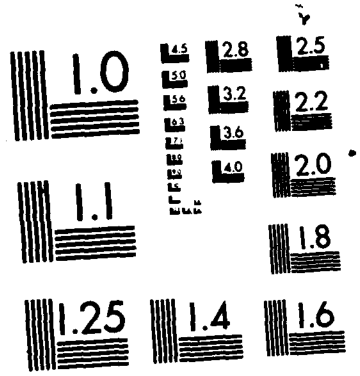
Figure A 23 Water tributyltin content Little Creek


NAUTICAL MILE
0
0
1
KILOMETER
N
NAVAL AMPHIBIOUS BASE
Little Creek, Virginia
CHESAPEAKE BAY
Little Creek Channel
Fishermans Cove
Desert Cove
Lookout Tower
Little Creek Cove
LCM/LCU Piers
Marina Ramp
US Hwy 60
USCG Station
WHITEHURST
1
2
3
4
5
6
7
8
9
10
11
12
13

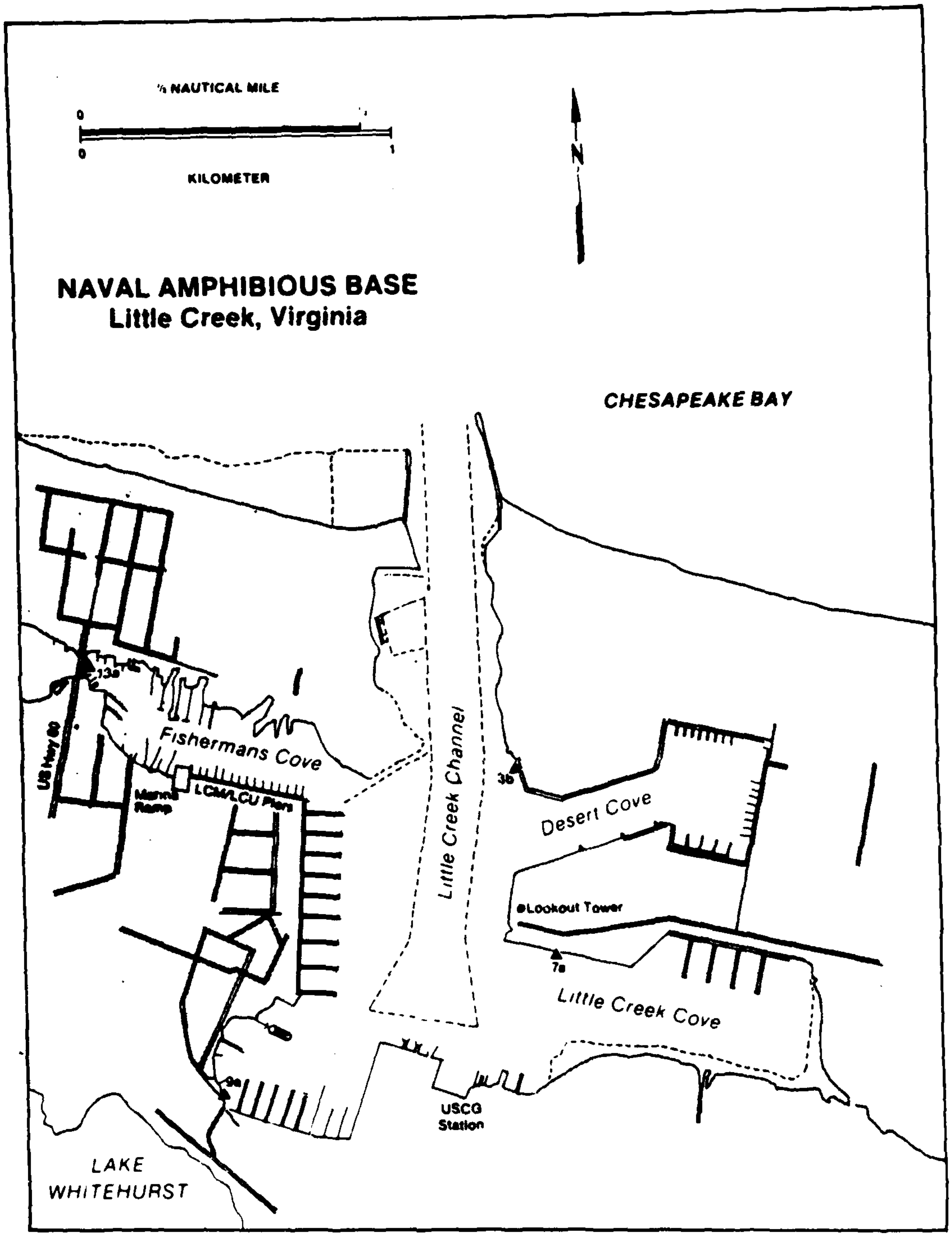
SEDIMENT

AD-A181 202 BUTYLTIN CONCENTRATIONS IN SELECTED US HARBOR SYSTEMS A BASELINE ASSESSMENT(U) NAVAL OCEAN SYSTEMS CENTER SAN DIEGO CA J G GROVHOUG ET AL. APR 87 NOSC/TR-1155 2/3

UNCLASSIFIED F/G 11/3 NL



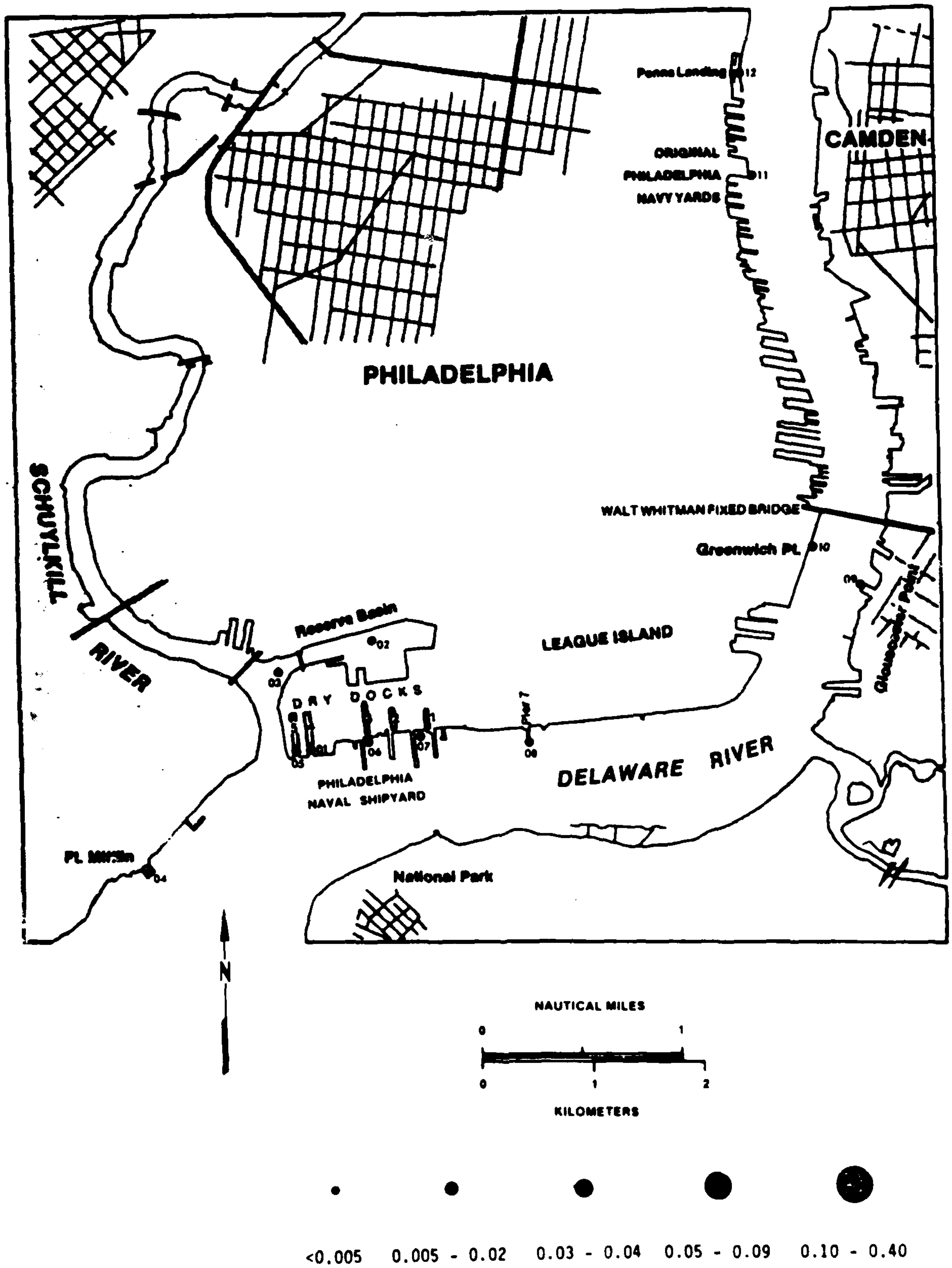
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A



TISSUE µg/g Total Organic Solvent Extractable Tin

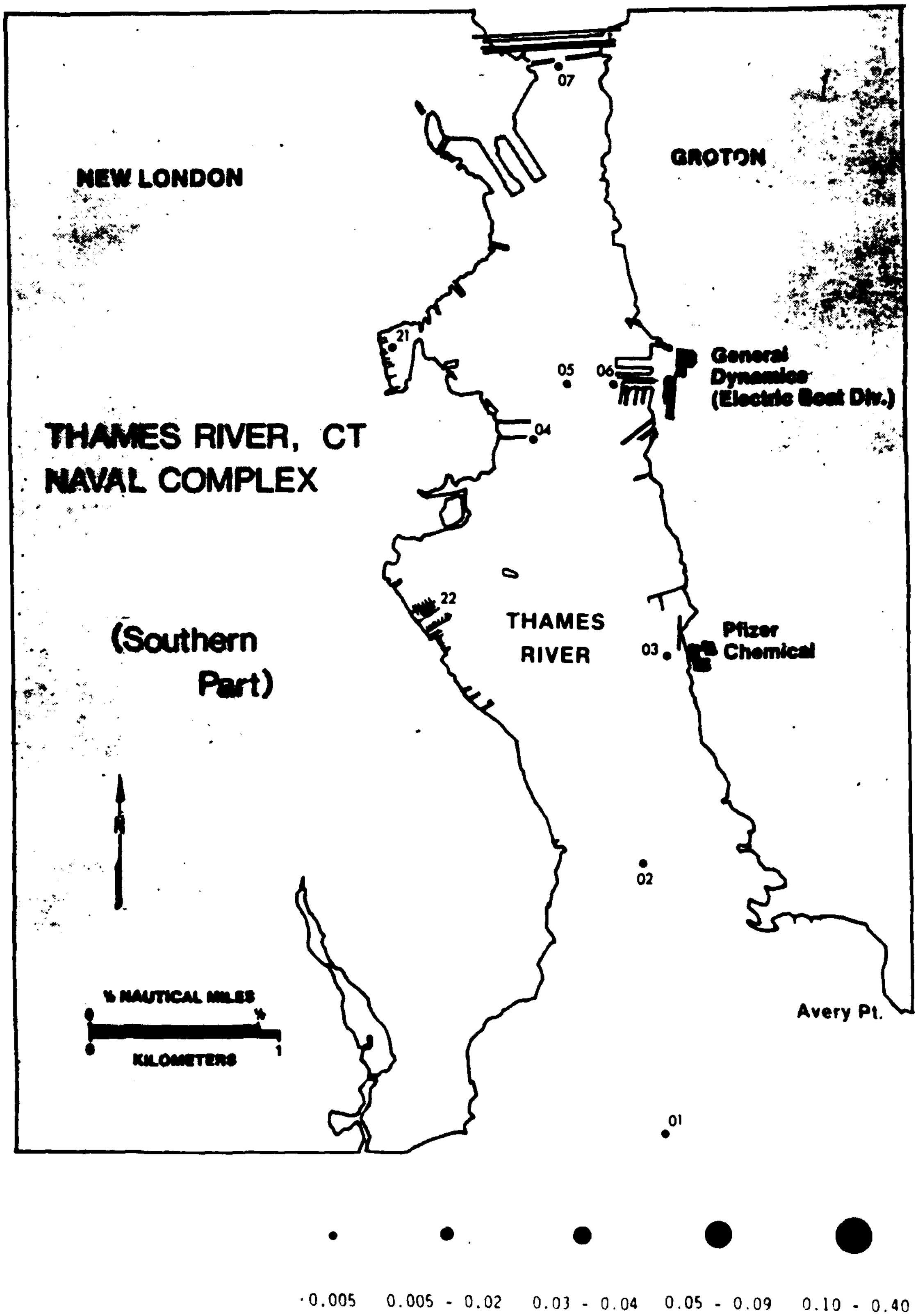
Dry Weight	<0.50	0.50 - 0.99	1.00 - 2.50	2.5 - 3.9	4.0 - 7.85
Wet Weight	· 0.08	0.08 - 0.15	0.16 - 0.39	0.40 - 0.63	0.64 - 1.26

Figure A-25. Tissue organic solvent extractable tin concentrations: Little Creek.



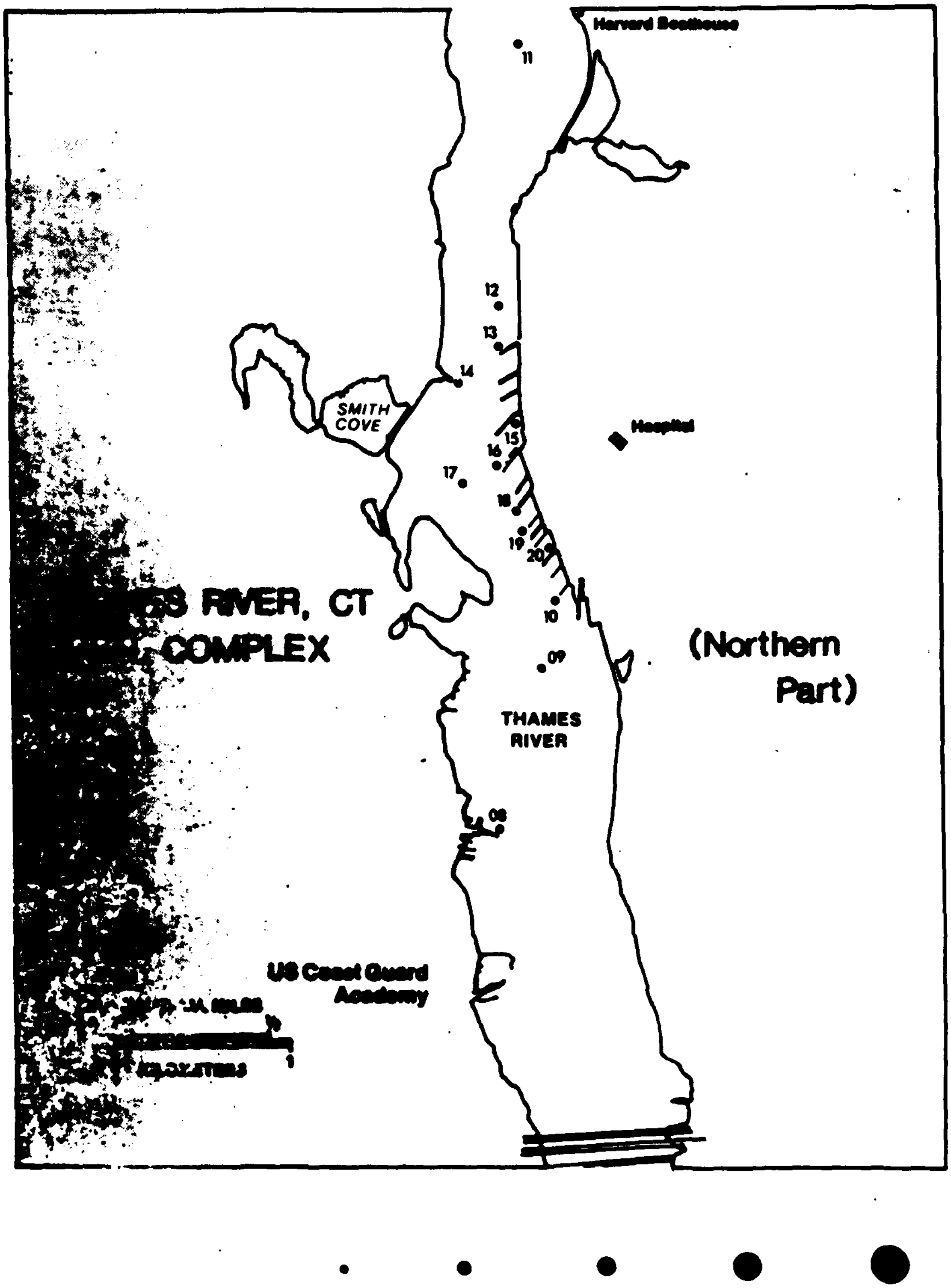
WATER µg/l TBT (tributyltin)

Figure A-23. Water tributyltin content: Philadelphia (Delaware River).

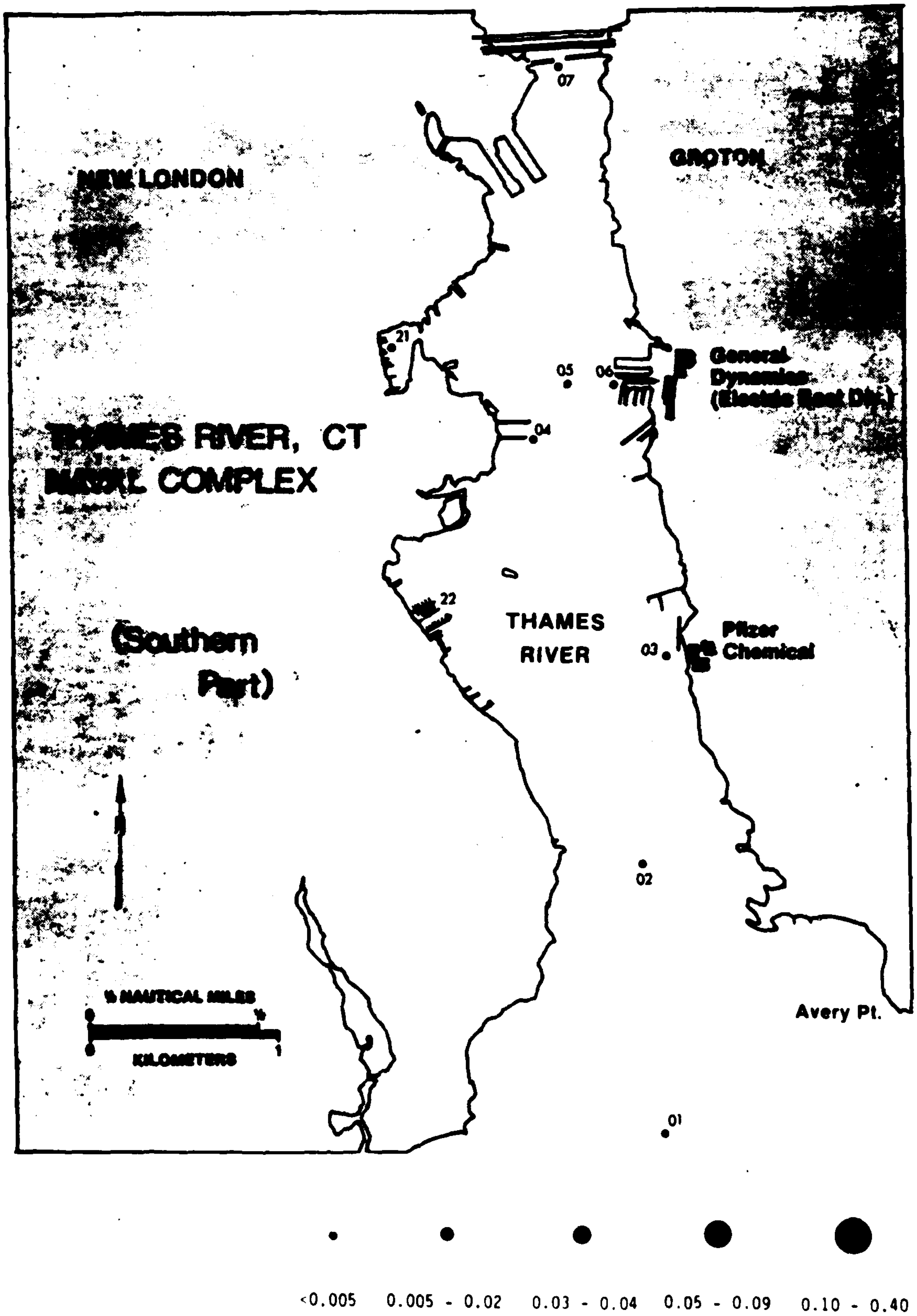


WATER µg/l TBT (tributyltin)

Figure A-27 Water tributyltin content New London Groton (southern part)



F̃ıg̃ re A. 28 Water tributyltin content: New London/ Groton (northern part).



WATER µg/l TBT (tributyltin)

Figure A-27. Water tributyltin content: New London/Groton (southern part).

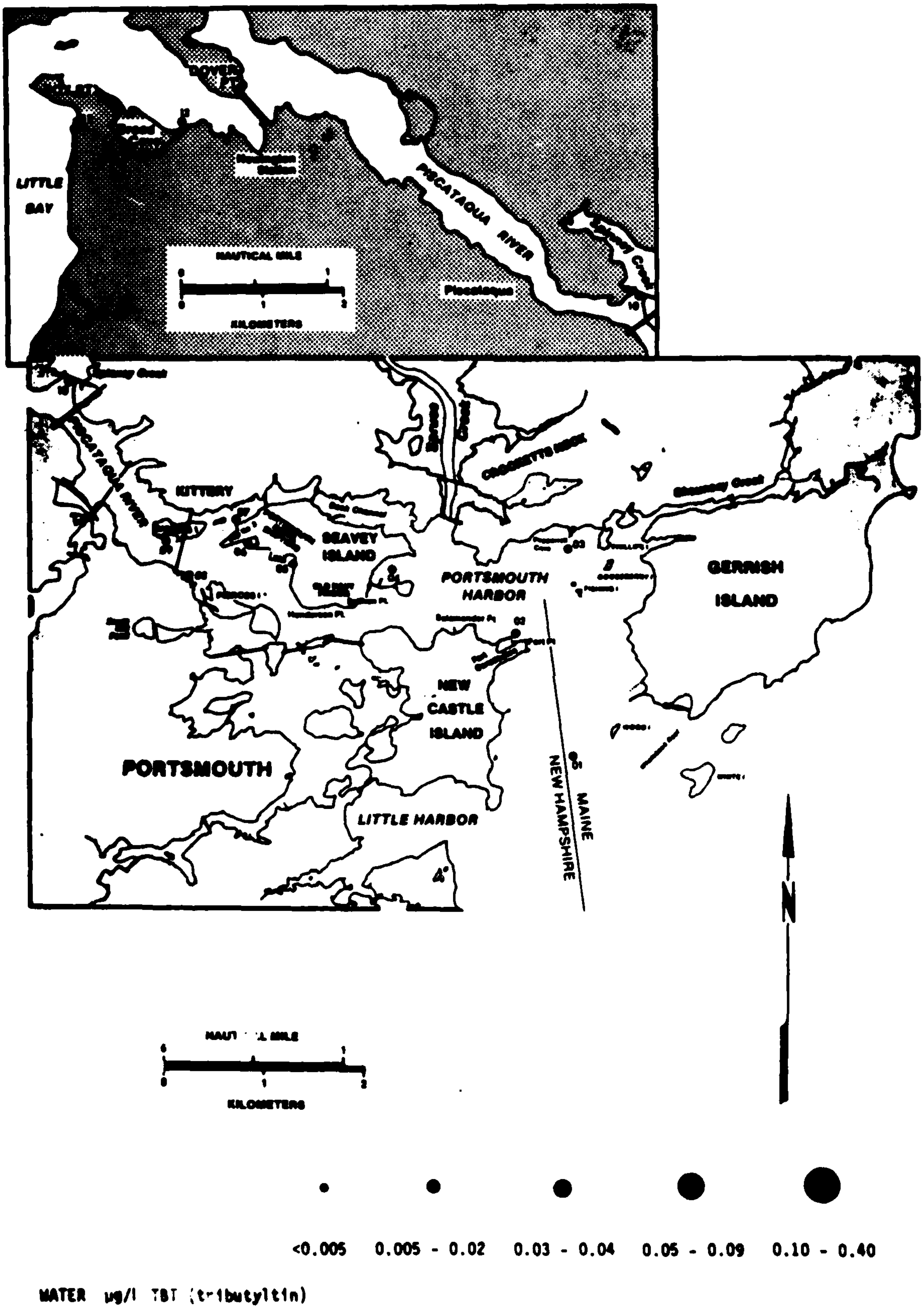


Figure A-30. Water tributyltin content: Portsmouth (Piscataqua River).

APPENDIX B

STATION DATA

Table B-1(w). Water sample station data: San Diego Bay.

Sample#	Date	Time	Latitude	Longitude	Remarks
SD1-01A-W-1	14FEB84	1315U	32-40-00N	117-13-22W	Adj.jetty end EntrPt
SD1-02A-W-1	14FEB84	13281	32-41-02N	117-13-55W	Offpltfm200SBallstPt
SD1-04-W-1	14FEB84	1335U	32-41-21N	117-14-11W	SUBASE-Nsidelongpier
SD1-04-W-2	14FEB84	1336U	32-41-21N	117-14-11W	SUBASE-Nsidelongpier
SD1-06-W-1	14FEB84	1426U	32-42-30N	117-13-08W	Sta 6A-No.Is.S pier
SD1-07-W-1	14FEB84	1446U	32-42-28N	117-14-04.5W	@EntrShelterIsMarina
SD1-08-W-1	14FEB84	1405U	32-42-53.5N	117-13-48W	ShltrIsAdjMidChMkr#9
SD1-09-W-1	14FEB84	1358U	32-43-05N	117-13-34.5W	ShltrIs-offYachtClub
SD1-09-W-2	14FEB84	1359U	32-43-05N	117-13-34.5W	ShltrIs-offYachtClub
SD1-10-W-1	14FEB84	1514U	32-43-12N	117-13-09.5W	CommBasin-@BaliHaidk
SD1-11-W-1	14FEB84	1455U	32-43-14N	117-13-20.5W	CommBasin-AdjChMkr#2
SD1-12-W-1	14FEB84	1436U	32-43-17.5N	117-13-34W	CBasin-offKMarRailwy
SD1-12-W-2	14FEB84	1437U	32-43-17.5N	117-13-34W	CBasin-offKMarRailwy
SD1-13-W-1	14FEB84	1630U	32-43-08N	117-11-34W	Adj.tobuoy#21-midbay
SD1-14-W-1	15FEB84	1630U	32-43-25.5N	117-10-28W	NorthTunaFlt-midpier
SD1-15-W-1	15FEB84	1628U	32-42-31N	117-11-13W	OffNorthIs CVA Pier
SD1-15-W-2	15FEB84	1630U	32-42-39N	117-11-17W	OffNorIs SECruzrPier
SD1-16-W-1	15FEB84	1616U	32-42-28.5N	117-10-04W	5thAveMarina-N end
SD1-16-W-2	15FEB84	1618U	32-42-27N	117-09-55.5W	5thAveMarina-btn3&4
SD1-16-W-3	15FEB84	1621U	32-42-21N	117-09-53.5W	5thAveMarina-Entr Ch
SD1-17-W-1	15FEB84	1605U	32-42-09.5N	117-09-39W	Campbell Shpyd-offDD
SD1-18-W-1	15FEB84	1550U	32-41-25.5N	117-09-06W	CoronadoBrdge-pier19
SD1-19-W-1	15FEB84	1605U	32-41-18N	117-08-22W	Adj.NASSCOShydFlDDok
SD1-20-W-1	15FEB84	1508U	32-41-02.5N	117-07-50W	NAVSTA-NRngeadjpier2
SD1-22-W-1	15FEB84	1514U	32-41-03N	117-08-04W	NAVSTA-NRngeendpier1
SD1-24-W-1	15FEB84	1518U	32-40-59N	117-08-35W	Adj. to buoy #26
SD1-26-W-1	15FEB84	1342U	32-40-53N	117-09-20W	@26A-NEtipAmphibBase
SD1-27-W-1	15FEB84	1411U	32-40-54N	117-07-43W	NAVSTA-SsidePier3
SD1-29-W-1	15FEB84	1428U	32-40-44N	117-07-27W	NAVSTA-MidRngePier#5
SD1-31-W-1	15FEB84	1442U	32-40-38.5N	117-07-39W	NAVSTA-end of Pier#5
SD1-33-W-1	15FEB84	1517U	32-40-2.5N	117-07-55W	NAVSTA-MidRngeSoBay
SD1-36-W-1	15FEB84	1605U	32-39-40N	117-09-06W	NAVSTA-MidRngeWendSS
SD1-38-W-1	24FEB84	1054U	32-40-28.5N	117-07-18.5W	NAVSTA-end of Pier#8
SD1-39-W-1	24FEB84	1045U	32-40-12N	117-07-19W	NAVSTA-Nside of Mole
SD1-40-W-1	24FEB84	1030U	32-39-54N	117-07-09W	NAVSTA-SRngebtw11&12
SD1-42-W-1	24FEB84	1012U	32-39-24N	117-07-33W	NAVSTA-SRnge@buoy#34
SD1-44-W-1	24FEB84	0918U	32-38-32N	117-08-14.5W	NAVSTA-SRngeWendSlvr
SD1-44A-W-1	23FEB84	1106U	32-38-19N	117-07-57W	CrndoCays@NChMkr#2
SD1-46-W-1	23FEB84	1200U	32-38-11N	117-07-10W	@ChMkr#1ChulaVSmBBsn
SD1-48-W-1	16FEB84	1155U	32-37-06N	117-07-06W	NWofSDG&EleveeSo.Bay
SD1-48A-W-1	23FEB84	1115U	32-37-19N	117-07-39W	CrndoCaysSCh@Mkr#22
SD1-49-W-1	16FEB84	1220U	32-36-58N	117-07-11.5W	IntkeCh-SDG&E So.Bay
SD1-49A-W-1	16FEB84	1142U	32-37-27.5N	117-06-16.5W	ChulaVstaSmBoatBsnFP
SD1-50-W-1	16FEB84	1100U	32-36-42N	117-06-19W	DischgChforSDG&EPlnt
SD1-51-W-1	16FEB84	1118U	32-36-32N	117-06-48.5W	Offtipof SDG&E levee
SD1-52-W-1	16FEB84	1133U	32-36-32N	117-07-16.5W	SmstSDBaySiteEmoryCh

Table B-1(s). Sediment sample station data: San Diego Bay.

Sample#	Latitude(N)	Longitude(W)	Location	Depth
SD1-01-S-1	32-39-53N	117-13-32W	Adj.2buoy#8 Entr.Ch.	11.0
SD1-01-S-2	32-39-53	117-13-32	Adj.2buoy#8 Entr.Ch.	11.0
SD1-01-S-3	32-39-53	117-13-32	Adj.2buoy#8 Entr.Ch.	11.0
SD1-02-S-1	32-40-58	117-13-55.5	NWfmbuoy#11BallastPt	3.5
SD1-02-S-2	32-40-58	117-13-55.5	NWfmbuou#11BallastPt	3.0
SD1-02-S-3	32-40-58	117-13-55.5	NWfmbuoy#11BallastPt	3.0
SD1-03-S-1	32-41-15	117-14-03	SUBASE-BallstPtSPier	9.1
SD1-03-S-2	32-41-15	117-14-03	SUBASE-BallstPtSPier	9.1
SD1-03-S-3	32-41-15	117-14-03	SUBASE-BallstPtSPier	9.1
SD1-04-S-1	32-41-21	117-14-11	SUBASE-NsideLongPier	7.4
SD1-04-S-2	32-41-21	117-14-11	SUBASE-NsideLongPier	7.4
SD1-04-S-3	32-41-21	117-14-11	SUBASE-NsideLongPier	7.4
SD1-05-S-1	32-41-24	117-14-08	SUBASE-midwayNPiers	8.9
SD1-05-S-2	32-41-24	117-14-08	SUBASE-midwayNPiers	8.9
SD1-05-S-3	32-41-24	117-14-08	SUBASE-midwayNPiers	8.9
SD1-06-S-1	32-42-18	117-13-23	offNoIs.adj2buoy#16A	5.6
SD1-06-S-2	32-42-18	117-13-23	offNoIs.adj2buoy#16A	5.6
SD1-06-S-3	32-42-18	117-13-23	offNoIs.adj2buoy#16A	5.6
SD1-07-S-1	32-42-28	117-14-04.5	SWendShelterIsMkr#2	5.8
SD1-07-S-2	32-42-28	117-14-04.5	SWendShelterIsMkr#2	5.8
SD1-07-S-3	32-42-28	117-14-04.5	SWendShelterIsMkr#2	5.8
SD1-08-S-1	32-42-53.5	117-13-48	ShelterIsMidChMkr#9	5.0
SD1-08-S-2	32-42-53.5	117-13-48	ShelterIsMidChMkr#9	5.0
SD1-08-S-3	32-42-53.5	117-13-48	ShelterIsMidChMkr#9	5.0
SD1-09-S-1	32-43-05	117-13-34.5	ShltrIs.adjYachtClub	4.5
SD1-09-S-2	32-43-05	117-13-34.5	ShltrIs.adjYachtClub	4.5
SD1-09-S-3	32-43-05	117-13-34.5	ShltrIs.adjYachtClub	4.5
SD1-10-S-1	32-43-12	117-13-09.5	Commercial Basin-NE	3.5
SD1-10-S-2	32-43-12	117-13-09.5	Commercial Basin-NE	3.5
SD1-10-S-3	32-43-12	117-13-09.5	Commercial Basin-NE	3.5
SD1-11-S-1	32-43-14	117-13-20.5	Comm.Basin-adjChMkr2	6.0
SD1-11-S-2	32-43-14	117-13-20.5	Comm.Basin-adjChMkr2	6.0
SD1-11-S-3	32-43-14	117-13-20.5	Comm.Basin-adjChMkr2	6.0
SD1-12-S-1	32-43-17.5	117-13-34	Comm.Basin-@Ket'berg	5.1
SD1-12-S-2	32-43-17.5	117-13-34	Comm.Basin-@Ket'berg	5.1
SD1-12-S-3	32-43-17.5	117-13-34	Comm.Basin-@Ket'berg	5.1
SD1-13-S-1	32-43-08	117-11-34	Adj. to buoy #21	10.0
SD1-13-S-2	32-43-08	117-11-34	Adj. to buoy #21	10.0
SD1-13-S-3	32-43-08	117-11-34	Adj. to buoy #21	10.0
SD1-14-S-1	32-43-25.5	117-10-28	Tuna Flt-midpier	5.0
SD1-14-S-2	32-43-25.5	117-10-28	Tuna Flt-midpier	5.0
SD1-14-S-3	32-43-25.5	117-10-28	Tuna Flt-midpier	5.0
SD1-15-S-1	32-43-31	117-11-13	600m off CVA Pier-NI	8.0
SD1-15-S-2	32-43-31	117-11-13	600m off CVA Pier-NI	8.0
SD1-15-S-3	32-43-31	117-11-13	600m off CVA Pier-NI	8.0
SD1-16-S-1	32-42-28.5	117-10-104	5thAveMarina-No.Basi	4.0
SD1-16-S-2	32-42-27	117-09-55.5	5thAveMarina-3&4slip	4.5
SD1-16-S-3	32-42-21	117-09-53.5	5thAveMarina-Entr.Ch	5.5
SD1 16-S-4	32-42-20	117-09-50.5	5thAveMarina-7&8slip	5.0
SD1-17-S-1	32-42-09.5	117-09-39	CampbellShipydFlDDok	9.2

Table B-1(s). Sediment sample station data: San Diego Bay (continued).

Sample#	Latitude(N)	Longitude(W)	Location	Depth
SD1-17-S-2	32-42-09.5	117-09-39	CampbellShipydFlDDok	9.2
SD1-17-S-3	32-42-09.5	117-09-39	CampbellShipydFlDDok	9.2
SD1-18-S-1	32-41-25	117-09-06	CoronadoBrdge-Pier19	11.0
SD1-18-S-2	32-41-25	117-09-06	CoronadoBrdge-Pier19	11.0
SD1-18-S-3	32-41-25	117-09-06	CoronadoBrdge-Pier19	11.0
SD1-19-S-1	32-41-18	117-08-22	Adj.NASSCOShydFlDDok	8.0
SD1-19-S-2	32-41-18	117-08-22	Adj.NASSCOShydFlDDok	8.0
SD1-19-S-3	32-41-18	117-08-22	Adj.NASSCOShydFlDDok	8.0
SD1-20-S-1	32-41-02.5	117-07-50	NAVSTAequiPier2&quay	9.0
SD1-20-S-2	32-41-02.5	117-07-50	NAVSTAequiPier2&quay	9.0
SD1-20-S-3	32-41-02.5	117-07-50	NAVSTAequiPier2&quay	9.0
SD1-21-S-1	32-41-02.5	117-07-56	200m off SsidePier#1	10.0
SD1-21-S-2	32-41-02.5	117-07-56	200m off SsidePier#1	10.0
SD1-21-S-3	32-41-02.5	117-07-56	200m off SsidePier#1	10.0
SD1-22-S-1	32-41-03	117-08-04	NAVSTA @ end Pier #1	9.0
SD1-22-S-2	32-41-03	117-08-04	NAVSTA @ end Pier #1	9.0
SD1-22-S-3	32-41-03	117-08-04	NAVSTA @ end Pier #1	9.0
SD1-23-S-1	32-41-01.5	117-08-21	Midch E of buoy #26	10.0
SD1-23-S-2	32-41-01.5	117-08-21	Midch E of buoy #26	10.0
SD1-23-S-3	32-41-01.5	117-08-21	Midch E of buoy #26	10.0
SD1-24-S-1	32-40-59	117-08-35	Adj. to buoy #26	10.1
SD1-24-S-2	32-40-59	117-08-35	Adj. to buoy #26	10.1
SD1-24-S-3	32-40-59	117-08-35	Adj. to buoy #26	10.1
SD1-25-S-1	32-41-01	117-08-59	~700mNE fm AmphbBase	1.5
SD1-25-S-2	32-41-01	117-08-59	~700mNE fm AmphbBase	1.5
SD1-25-S-3	32-41-01	117-08-59	~700mNE fm AmphbBase	1.5
SD1-26-S-1	32-41-01.5	117-09-24	Adj.ChMkr#3AmphbBase	5.5
SD1-26-S-2	32-41-01.5	117-09-24	Adj.ChMkr#3AmphbBase	5.5
SD1-26-S-3	32-41-01.5	117-09-24	Adj.ChMkr#3AmphbBase	5.5
SD1-27-S-1	32-40-54	117-07-43	NAVSTA SsidePier#3	9.3
SD1-27-S-2	32-40-54	117-07-43	NAVSTA SsidePier#3	9.3
SD1-27-S-3	32-40-54	117-07-43	NAVSTA SsidePier#3	9.3
SD1-28-S-1	32-40-44	117-07-20.5	NAVSTA MidwyPiers4&5	9.0
SD1-28-S-2	32-40-44	117-07-20.5	NAVSTA MidwyPiers4&5	9.0
SD1-28-S-3	32-40-44	117-07-20.5	NAVSTA MidwyPiers4&5	9.0
SD1-29-S-1	32-40-44	117-07-27	NAVSTAoffDDockPier#5	7.0
SD1-29-S-2	32-40-44	117-07-27	NAVSTAoffDDockPier#5	7.0
SD1-29-S-3	32-40-44	117-07-27	NAVSTAoffDDockPier#5	7.0
SD1-30-S-1	32-40-41.5	117-07-31.5	NAVSTA SsideofPier#5	10.0
SD1-30-S-2	32-40-41.5	117-07-31.5	NAVSTA SsideofPier#5	10.0
SD1-30-S-3	32-40-41.5	117-07-31.5	NAVSTA SsideofPier#5	10.0
SD1-31-S-1	32-40-38.5	117-07-39	NAVSTA end of Pier#5	8.0
SD1-31-S-2	32-40-38.5	117-07-39	NAVSTA end of Pier#5	8.0
SD1-31-S-3	32-40-38.5	117-07-39	NAVSTA end of Pier#5	8.0
SD1-32-S-1	32-40-32	117-07-46	NAVSTA (MiddleRange)	10.0
SD1-32-S-2	32-40-32	117-07-46	NAVSTA (MiddleRange)	10.0
SD1-32-S-3	32-40-32	117-07-46	NAVSTA (MiddleRange)	10.0
SD1-33-S-1	32-40-25	117-07-55	NAVSTA (MiddleRange)	4.0
SD1-33-S-2	32-40-25	117-07-55	NAVSTA (MiddleRange)	4.0
SD1-33-S-3	32-40-25	117-07-55	NAVSTA (MiddleRange)	4.0

Table B-1(s). Sediment sample station data: San Diego Bay (continued).

Sample#	Latitude(N)	Longitude(W)	Location	Depth
SD1-34-S-1	32-40-12	117-08-16	NAVSTA (MiddleRange)	3.0
SD1-34-S-2	32-40-12	117-08-16	NAVSTA (MiddleRange)	3.0
SD1-34-S-3	32-40-12	117-08-16	NAVSTA (MiddleRange)	3.0
SD1-35-S-1	32-39-56	117-08-40.5	NAVSTA (MiddleRange)	3.0
SD1-35-S-2	32-39-56	117-08-40.5	NAVSTA (MiddleRange)	3.0
SD1-35-S-3	32-39-56	117-08-40.5	NAVSTA (MiddleRange)	3.0
SD1-36-S-1	32-39-40	117-09-06	NAVSTA(MidRange)SStd	2.0
SD1-36-S-2	32-39-40	117-09-06	NAVSTA(MidRange)SStd	2.0
SD1-36-S-3	32-39-40	117-09-06	NAVSTA(MidRange)SStd	2.0
SD1-37-S-1	32-40-31	117-07-28	NAVSTA betwnPiers6&7	8.0
SD1-37-S-2	32-40-31	117-07-28	NAVSTA betwnPiers6&7	8.0
SD1-37-S-3	32-40-31	117-07-28	NAVSTA betwnPiers6&7	8.0
SD1-38-S-1	32-40-28.5	117-07-18.5	NAVSTA Nside Pier #8	10.0
SD1-38-S-2	32-40-28.5	117-07-18.5	NAVSTA Nside Pier #8	10.0
SD1-38-S-3	32-40-28.5	117-07-18.5	NAVSTA Nside Pier #8	10.0
SD1-39-S-1	32-40-12	117-07-19	NAVSTASRngeNSideMole	6.0
SD1-39-S-2	32-40-12	117-07-19	NAVSTASRngeNSideMole	6.0
SD1-39-S-3	32-40-12	117-07-19	NAVSTASRngeNSideMole	6.0
SD1-40-S-1	32-39-54	117-07-09	NAVSTASRngePier11&12	8.0
SD1-40-S-2	32-39-54	117-07-09	NAVSTASRngePier11&12	8.0
SD1-40-S-3	32-39-54	117-07-09	NAVSTASRngePier11&12	8.0
SD1-41-S-1	32-39-36	117-07-21	NAVSTA end of Pier13	10.0
SD1-41-S-2	32-39-36	117-07-21	NAVSTA end of Pier13	10.0
SD1-41-S-3	32-39-36	117-07-21	NAVSTA end of Pier13	10.0
SD1-42-S-1	32-39-24	117-07-33	NAVSTA Adj buoy #34	6.5
SD1-42-S-2	32-39-24	117-07-33	NAVSTA Adj buoy #34	6.5
SD1-42-S-3	32-39-24	117-07-33	NAVSTA Adj buoy #34	6.5
SD1-43-S-1	32-38-56	117-07-53	NAVSTA SRnge midbay	2.5
SD1-43-S-2	32-38-56	117-07-53	NAVSTA SRnge midbay	2.5
SD1-43-S-3	32-38-56	117-07-53	NAVSTA SRnge midbay	2.5
SD1-44-S-1	32-38-32	117-08-14.5	NAVSTA SRnge (W end)	3.0
SD1-44-S-2	32-38-32	117-08-14.5	NAVSTA SRnge (W end)	3.0
SD1-44-S-3	32-38-32	117-08-14.5	NAVSTA SRnge (W end)	3.0
SD1-45-S-1	32-38-39	117-07-21.5	Adj to buoy #41 SBay	6.0
SD1-45-S-2	32-38-39	117-07-21.5	Adj to buoy #41 SBay	6.0
SD1-45-S-3	32-38-39	117-07-21.5	Adj to buoy #41 SBay	6.0
SD1-46-S-1	32-38-11	117-07-10	Adj to ChMkr#1-CVSBB	7.0
SD1-46-S-2	32-38-11	117-07-10	Adj to ChMkr#1-CVSBB	7.0
SD1-46-S-3	32-38-11	117-07-10	Adj to ChMkr#1-CVSBB	7.0
SD1-47-S-1	32-38-43	117-07-15	80mEofCCaysChMkr#15	3.0
SD1-47-S-2	32-38-43	117-07-15	80mEofCCaysChMkr#15	3.0
SD1-47-S-3	32-38-43	117-07-15	80mEofCCaysChMkr#15	3.0
SD1-48-S-1	32-37-06	117-07-06	NWofSDG&Elevee(SBay)	2.0
SD1-48-S-2	32-37-06	117-07-06	NWofSDG&Elevee(SBay)	2.0
SD1-48-S-3	32-37-06	117-07-06	NWofSDG&Elevee(SBay)	2.0
SD1-49-S-1	32-36-58	117-06-11.5	IntakeChtoSDG&EPlant	2.0
SD1-49-S-2	32-36-58	117-06-11.5	IntakeChtoSDG&EPlant	2.0
SD1-49-S-3	32-36-58	117-06-11.5	IntakeChtoSDG&EPlant	2.0
SD1-50-S-1	32-36-42	117-06-19	DChrgeChofSDG&EPlant	1.5
SD1-50-S-2	32-36-42	117-06-19	DChrgeChofSDG&EPlant	1.5

Table B-1(s). Sediment sample station data: San Diego Bay (continued).

Sample#	Latitude(N)	Longitude(W)	Location	Depth
SD1-50-S-3	32-36-42	117-06-19	DChrgeChofSDG&EPlant	1.5
SD1-51-S-1	32-36-29	117-06-48.5	OfftipofSDG&E levee	2.2
SD1-51-S-2	32-36-29	117-06-48.5	OfftipofSDG&E levee	2.2
SD1-51-S-3	32-36-29	117-06-48.5	OfftipofSDG&E levee	2.2
SD1-52-S-1	32-36-29	117-07-16.5	SoSDBay-nearEmoryCh	1.0
SD1-52-S-2	32-36-29	117-07-16.5	SoSDBay-nearEmoryCh	1.0
SD1-52-S-3	32-36-29	117-07-16.5	SoSDBay-nearEmoryCh	1.0

Table B-1(t). Tissue sample station data: San Diego Bay.

Sample#	Date	Time	Latitude	Longitude	Remarks
SD1-02B-T-1	23FEB84	0900U	32-41-12N	117-13-39W	DegausRnge-2ndpiling
SD1-02B-T-2	23FEB84	0901U	32-41-12N	117-13-39W	DegausRnge-2ndpiling
SD1-02B-T-3	23FEB84	0902U	32-41-12N	117-13-39W	DegausRnge-2ndpiling
SD1-02B-T-4	23FEB84	0903U	32-41-12N	117-13-39W	DegausRnge-2ndpiling
SD1-02B-T-5	23FEB84	0904U	32-41-12N	117-13-39W	DegausRnge-2ndpiling
SD1-04-T-1	14FEB84	1330U	32-41-21N	117-14-11W	SUBASE-Nsidelongpier
SD1-04-T-2	14FEB84	1331U	32-41-21N	117-14-11W	SUBASE-Nsidelongpier
SD1-04-T-3	14FEB84	1332U	32-41-21N	117-14-11W	SUBASE-Nsidelongpier
SD1-04-T-4	14FEB84	1333U	32-41-21N	117-14-11W	SUBASE-Nsidelongpier
SD1-04-T-5	14FEB84	1334U	32-41-21N	117-14-11W	SUBASE-Nsidelongpier
SD1-04A-T-1	23FEB84	0851U	32-41-22N	117-14-00W	SUBASE-off S dolphin
SD1-04A-T-2	23FEB84	0852U	32-41-22N	117-14-00W	SUBASE-off S dolphin
SD1-04A-T-3	23FEB84	0853U	32-41-22N	117-14-00W	SUBASE-off S dolphin
SD1-04A-T-4	23FEB84	0854U	32-41-22N	117-14-00W	SUBASE-off S dolphin
SD1-04A-T-5	23FEB84	0855U	32-41-22N	117-14-00W	SUBASE-off S dolphin
SD1-06-T-1	14FEB84	1426U	32-42-30N	117-13-08W	Sta 6A-No.Is.S pier
SD1-06-T-2	14FEB84	1427U	32-42-30N	117-13-08W	Sta 6A-No.Is.S pier
SD1-06-T-3	14FEB84	1428U	32-42-30N	117-13-08W	Sta 6A-No.Is.S pier
SD1-06-T-4	14FEB84	1429U	32-42-30N	117-13-08W	Sta 6A-No.Is.S pier
SD1-06-T-5	14FEB84	1430U	32-42-30N	117-13-08W	Sta 6A-No.Is.S pier
SD1-07-T-1	14FEB84	1416U	32-42-28N	117-14-04.5W	EntrShelterIsMarina
SD1-07-T-2	14FEB84	1417U	32-42-28N	117-14-04.5W	EntrShelterIsMarina
SD1-07-T-3	14FEB84	1418U	32-42-28N	117-14-04.5W	EntrShelterIsMarina
SD1-07A-T-4	23FEB84	0945U	32-42-23N	117-14-08W	UnderSIO pier-middle
SD1-07A-T-5	23FEB84	0946U	32-42-23N	117-14-08W	UnderSIO pier-middle
SD1-10-T-1	14FEB84	1510U	32-43-12N	117-13-09.5W	CommBasin-@BaliHaidk
SD1-10-T-2	14FEB84	1511U	32-43-12N	117-13-09.5W	CommBasin-@BaliHaidk
SD1-10-T-3	14FEB84	1512U	32-43-12N	117-13-09.5W	CommBasin-@BaliHaidk
SD1-10-T-4	14FEB84	1513U	32-43-12N	117-13-09.5W	CommBasin-@BaliHaidk
SD1-10-T-5	14FEB84	1514U	32-43-12N	117-13-09.5W	CommBasin-@BaliHaidk
SD1-10B-T-1	23FEB84	1018U	32-43-41N	117-12-50W	UnderNTCbridge-centr
SD1-10B-T-2	23FEB84	1019U	32-43-41N	117-12-50W	UnderNTCbridge-centr
SD1-10B-T-3	23FEB84	1020U	32-43-41N	117-12-50W	UnderNTCbridge-centr
SD1-10B-T-4	23FEB84	1021U	32-43-41N	117-12-50W	UnderNTCbridge-centr
SD1-10B-T-5	23FEB84	1022U	32-43-41N	117-12-50W	UnderNTCbridge-centr
SD1-14-T-1	15FEB84	1645U	32-43-25.5N	117-10-28W	Tuna Fleet-Mid Pier
SD1-14-T-2	15FEB84	1646U	32-43-25.5N	117-10-28W	Tuna Fleet-Mid Pier
SD1-14-T-3	15FEB84	1647U	32-43-25.5N	117-10-28W	Tuna Fleet-Mid Pier
SD1-14-T-4	15FEB84	1648U	32-43-25.5N	117-10-28W	Tuna Fleet-Mid Pier
SD1-14-T-5	15FEB84	1649U	32-43-25.5N	117-10-28W	Tuna Fleet-Mid Pier
SD1-15-T-1	15FEB84	1635U	32-42-39N	117-11-17W	CrzrPier-Sm.boatLndg
SD1-15-T-2	15FEB84	1636U	32-42-39N	117-11-17W	CrzrPier-Sm.boatLndg
SD1-15-T-3	15FEB84	1637U	32-42-39N	117-11-17W	CrzrPier-Sm.boatLndg
SD1-15-T-4	15FEB84	1638U	32-42-39N	117-11-17W	CrzrPier-Sm.boatLndg
SD1-15-T-5	15FEB84	1639U	32-42-39N	117-11-17W	CrzrPier-Sm.boatLndg
SD1-18-T-1	15FEB84	1555U	32-41-25N	117-09-06W	CoronadoBrdge-Pier19
SD1-18-T-2	15FEB84	1556U	32-41-25N	117-09-06W	CoronadoBrdge-Pier19
SD1-18-T-3	15FEB84	1557U	32-41-25N	117-09-06W	CoronadoBrdge-Pier19
SD1-18-T-4	15FEB84	1558U	32-41-25N	117-09-06W	CoronadoBrdge-Pier19
SD1-18-T-5	15FEB84	1559U	32-41-25N	117-09-06W	CoronadoBrdge-Pier19

Table B-1(t). Tissue sample station data: San Diego Bay (continued).

Sample#	Date	Time	Latitude	Longitude	Remarks
SD1-19-T-1	15FEB84	1600U	32-41-18N	117-09-06W	Adj.NASSCOShpydFlDDk
SD1-19-T-2	15FEB84	1601U	32-41-18N	117-09-06W	Adj.NASSCOShpydFlDDk
SD1-19-T-3	15FEB84	1602U	32-41-18N	117-09-06W	Adj.NASSCOShpydFlDDk
SD1-19-T-4	15FEB84	1603U	32-41-18N	117-09-06W	Adj.NASSCOShpydFlDDk
SD1-19-T-5	15FEB84	1604U	32-41-18N	117-09-06W	Adj.NASSCOShpydFlDDk
SD1-22-T-1	15FEB84	1515U	32-41-03N	117-08-04W	NAVSTA @ end Pier #1
SD1-22-T-2	15FEB84	1517U	32-41-03N	117-08-04W	NAVSTA @ end Pier #1
SD1-22-T-3	15FEB84	1519U	32-41-03N	117-08-04W	NAVSTA @ end Pier #1
SD1-22-T-4	15FEB84	1521U	32-41-03N	117-08-04W	NAVSTA @ end Pier #1
SD1-22-T-5	15FEB84	1523U	32-41-03N	117-08-04W	NAVSTA @ end Pier #1
SD1-26-T-1	15FEB84	1535U	32-40-53N	117-09-20W	fmpiling@ChMkr#3ABse
SD1-26-T-2	15FEB84	1536U	32-40-53N	117-09-20W	fmpiling@ChMkr#3ABse
SD1-26-T-3	15FEB84	1537U	32-40-53N	117-09-20W	fmpiling@ChMkr#3ABse
SD1-26-T-4	15FEB84	1538U	32-40-53N	117-09-20W	fmpiling@ChMkr#3ABse
SD1-26-T-5	15FEB84	1539U	32-40-53N	117-09-20W	fmpiling@ChMkr#3ABse
SD1-38A-T-1	23FEB84	1212U	32-40-18.5N	117-07-26.5W	NAVSTA@end of Pier#8
SD1-38A-T-2	23FEB84	1214U	32-40-18.5N	117-07-26.5W	NAVSTA@end of Pier#8
SD1-38A-T-3	23FEB84	12116	32-40-18.5N	117-07-26.5W	NAVSTA@end of Pier#8
SD1-38A-T-4	23FEB84	12136	32-40-18.5N	117-07-26.5W	NAVSTA@end of Pier#8
SD1-38A-T-5	23FEB84	12156	32-40-18.5N	117-07-26.5W	NAVSTA@end of Pier#8
SD1-44A-T-1	23FEB84	1110U	32-38-19N	117-07-57W	CornadoCays@NChMkr#2
SD1-44A-T-2	23FEB84	1112U	32-38-19N	117-07-57W	CornadoCays@NChMkr#2
SD1-44A-T-3	23FEB84	1114U	32-38-19N	117-07-57W	CornadoCays@NChMkr#2
SD1-44A-T-4	23FEB84	1116U	32-38-19N	117-07-57W	CornadoCays@NChMkr#2
SD1-44A-T-5	23FEB84	1118U	32-38-19N	117-07-57W	CornadoCays@NChMkr#2
SD1-48A-T-1	23FEB84	1120U	32-37-19N	117-07-39W	CrndoCays@SoChMkr#22
SD1-48A-T-2	23FEB84	1122U	32-37-19N	117-07-39W	CrndoCays@SoChMkr#22
SD1-48A-T-3	23FEB84	1124U	32-37-19N	117-07-39W	CrndoCays@SoChMkr#22
SD1-48A-T-4	23FEB84	1126U	32-37-19N	117-07-39W	CrndoCays@SoChMkr#22
SD1-48A-T-5	23FEB84	1128U	32-37-19N	117-07-39W	CrndoCays@SoChMkr#22
SD1-49A-T-1	23FEB84	1130U	32-37-27.5N	117-06-16.5W	ChulaVistaSmBBsnPier
SD1-49A-T-2	23FEB84	1131U	32-37-27.5N	117-06-16.5W	ChulaVistaSmBBsnPier
SD1-49A-T-3	23FEB84	1132U	32-37-27.5N	117-06-16.5W	ChulaVistaSmBBsnPier
SD1-49A-T-4	23FEB84	1133U	32-37-27.5N	117-06-16.5W	ChulaVistaSmBBsnPier
SD1-49A-T-5	23FEB84	1134U	32-37-27.5N	117-06-16.5W	ChulaVistaSmBBsnPier

Table B-2(w). Water sample station data: LA/Long Beach Harbor.

Sample#	Date	Time	Latitude	Longitude	Remarks
LB-01-W-1	25Jun85	0759U	33-43-21N	118-11-7.5W	25mSEoLBeachHorn-EntCh
LB-01-W-2	25Jun85	0800U	33-43-21N	118-11-7.5W	25mSEoLBeachHorn-EntCh
LB-01-W-3	25Jun85	0801U	33-43-21N	118-11-7.5W	25mSEoLBeachHorn-EntCh
LB-02-W-1	25Jun85	0820U	33-43-54N	118-11-48.5W	MdwybtwnPierJ&Brkwater
LB-03-W-1	25Jun85	0835U	33-44-36N	118-11-53W	30mSofEsidePierG-SEbsn
LB-04-W-1	25Jun85	0854U	33-44-43N	118-13-03W	15moffendofNavyMoleCtr
LB-05-W-1	25Jun85	0904U	33-45-22N	118-13-30W	15moffCaissontoDryDk#1
LB-05-W-2	25Jun85	0905U	33-45-22N	118-13-30W	15moffCaissontoDryDk#1
LB-05-W-3	25Jun85	0906U	33-45-22N	118-13-30W	15moffCaissontoDryDk#1
LB-06-W-1	25Jun85	0934U	33-45-11N	118-13-36W	20mEofPier#2-LBNShipYd
LB-07-W-1	25Jun85	0946U	33-45-11N	118-13-49.5W	100moffDDk#3-20mWPier3
LB-08-W-1	25Jun85	0959U	33-44-42N	118-14-26W	150moffEendNavyYchtClb
LB-08-W-2	25Jun85	1000U	33-44-42N	118-14-26W	150moffEendNavyYchtClb
LB-08-W-3	25Jun85	1001U	33-44-42N	118-14-26W	150moffEendNavyYchtClb
LB-08A-W-1	26Jun85	0858U	33-44-39N	118-14-30.5W	AlongShrline@NavyYchCb
LB-08A-W-2	26Jun85	0859U	33-44-39N	118-14-30.5W	AlongShrline@NavyYchCb
LB-08A-W-3	26Jun85	0900U	33-44-39N	118-14-30.5W	AlongShrline@NavyYchCb
LB-09-W-1	25Jun85	1011U	33-44-41N	118-13-29.5W	MdwyBtwnSIMApiers15&16
LB-10-W-1	25Jun85	1031U	33-46-10.5N	118-12-54W	AdjtoInnerHarborMarina
LB-10-W-2	25Jun85	1032U	33-46-10.5N	118-12-54W	AdjtoInnerHarborMarina
LB-10-W-3	25Jun85	1033U	33-46-10.5N	118-12-54W	AdjtoInnerHarborMarina
LB-11-W-1	25Jun85	1047U	33-46-16N	118-13-21W	30moffNsideTrngBas@Tex
LB-12-W-1	25Jun85	1102U	33-45-58N	118-14-10W	AdjMarinaSsideCerritos
LB-12-W-2	25Jun85	1103U	33-45-58N	118-14-10W	AdjMarinaSsideCerritos
LB-12-W-3	25Jun85	1104U	33-45-58N	118-14-10W	AdjMarinaSsideCerritos
LB-13-W-1	25Jun85	1121U	33-45-52N	118-15-06W	AdjEastBsnMarinaCertCh
LB-14-W-1	25Jun85	1135U	33-45-19.5N	118-16-37W	AdjToddShpBldgFlDryDck
LB-14-W-2	25Jun85	1136U	33-45-19.5N	118-16-37W	AdjToddShpBldgFlDryDck
LB-14-W-3	25Jun85	1137U	33-45-19.5N	118-16-37W	AdjToddShpBldgFlDryDck
LB-15-W-1	25Jun85	1200U	33-43-47N	118-16-13W	AdjSWMarinePiersDryDck
LB-15A-W-1	26Jun85	0955U	33-43-50.5N	118-16-05W	AlongShlineEendNWSMari
LB-16-W-1	25Jun85	1218U	33-42-41N	118-14-41W	30mNWofEJettytoMainChl
LB-16-W-2	25Jun85	1219U	33-42-41N	118-14-41W	30mNWofEJettytoMainChl
LB-16-W-3	25Jun85	1220U	33-42-41N	118-14-41W	30mNWofEJettytoMainChl
LB-17-W-1	25Jun85	1301U	33-43-26.5N	118-08-40.5W	50mNWofRecFshg"AnnieB"
LB-17-W-2	25Jun85	1302U	33-43-26.5N	118-08-40.5W	50mNWofRecFshg"AnnieB"
LB-17-W-3	25Jun85	1303U	33-43-26.5N	118-08-40.5W	50mNWofRecFshg"AnnieB"
LB-18-W-1	26Jun85	1101U	33-45-33N	118-11-01W	CtrLBchShorelineMarina
LB-18-W-2	26Jun85	1102U	33-45-33N	118-11-01W	CtrLBchShorelineMarina
LB-18-W-3	26Jun85	1103U	33-45-33N	118-11-01W	CtrLBchShorelineMarina
LB-18A-W-1	26Jun85	1046U	33-45-28N	118-10-57W	@Ent2LBShorelineMarina

Table B-2(s). Sediment sample station data: LA/Long Beach Harbor

Sample#	Latitude(N)	Longitude(W)	Location	Depth
LB-01-S-1	33-43-21N	118-11-7.5W	25mSEofLBeachHornEntCh	20.0
LB-01-S-2	33-43-21N	118-11-7.5W	25mSEofLBeachHornEntCh	19.5
LB-01-S-3	33-43-21N	118-11-7.5W	25mSEofLBeachHornEntCh	18.5
LB-02-S-1	33-43-54N	118-11-48.5W	MdwyBtwnPierJ&Breakwtr	17.0
LB-02-S-2	33-43-54N	118-11-48.5W	MdwyBtwnPierJ&Breakwtr	17.0
LB-02-S-3	33-43-54N	118-11-48.5W	MdwyBtwnPierJ&Breakwtr	17.0
LB-03-S-1	33-43-36N	118-11-53W	30mSofEsidePierG-SEBsn	16.0
LB-03-S-2	33-43-36N	118-11-53W	30mSofEsidePierG-SEBsn	16.0
LB-03-S-3	33-43-36N	118-11-53W	30mSofEsidePierG-SEBsn	16.0
LB-04-S-1	33-44-43N	118-13-03W	15moffEendoNavyMoleCtr	13.0
LB-04-S-2	33-44-43N	118-13-03W	15moffEendoNavyMoleCtr	13.0
LB-04-S-3	33-44-43N	118-13-03W	15moffEendoNavyMoleCtr	13.0
LB-05-S-1	33-45-22N	118-13-30W	15moffCaisson2DryDck#1	16.0
LB-05-S-2	33-45-22N	118-13-30W	15moffCaisson2DryDck#1	16.0
LB-05-S-3	33-45-22N	118-13-30W	15moffCaisson2DryDck#1	16.0
LB-06-S-1	33-45-11N	118-13-36W	20mEofPier#2-LBeachNSY	15.0
LB-06-S-2	33-45-11N	118-13-36W	20mEofPier#2-LBeachNSY	15.0
LB-06-S-3	33-45-11N	118-13-36W	20mEofPier#2-LBeachNSY	15.0
LB-07-S-1	33-45-11N	118-13-49.5W	100moffDryDk#3-20mWPr3	12.5
LB-07-S-2	33-45-11N	118-13-49.5W	100moffDryDk#3-20mWPr3	12.5
LB-07-S-3	33-45-11N	118-13-49.5W	100moffDryDk#3-20mWPr3	12.5
LB-08-S-1	33-44-42N	118-14-26W	15moffNavyYachtClubMar	11.5
LB-08-S-2	33-44-42N	118-14-26W	15moffNavyYachtClubMar	11.5
LB-08-S-3	33-44-42N	118-14-26W	15moffNavyYachtClubMar	11.5
LB-09-S-1	33-44-41N	118-13-29.5W	MdwyBtwnSIMApiers15&16	13.0
LB-09-S-2	33-44-41N	118-13-29.5W	MdwyBtwnSIMApiers15&16	13.0
LB-09-S-3	33-44-41N	118-13-29.5W	MdwyBtwnSIMApiers15&16	13.0
LB-10-S-1	33-46-10.5N	118-12-54W	Adj2InnerHarborMarinaM	13.5
LB-10-S-2	33-46-10.5N	118-12-54W	Adj2InnerHarborMarinaM	13.5
LB-10-S-3	33-46-10.5N	118-12-54W	Adj2InnerHarborMarinaM	13.5
LB-11-S-1	33-46-16N	118-13-21W	30moffNshrlineInHrbrTB	18.0
LB-11-S-2	33-46-16N	118-13-21W	30moffNshrlineInHrbrTB	18.0
LB-11-S-3	33-46-16N	118-13-21W	30moffNshrlineInHrbrTB	18.0
LB-12-S-1	33-45-58N	118-14-10W	AdjMarinaSsideHwy47Brg	16.0
LB-12-S-2	33-45-58N	118-14-10W	AdjMarinaSsideHwy47Brg	16.0
LB-12-S-3	33-45-58N	118-14-10W	AdjMarinaSsideHwy47Brg	16.0
LB-13-S-1	33-45-52N	118-15-06W	AdjEBsnMarina-Cerritos	14.0
LB-13-S-2	33-45-52N	118-15-06W	AdjEBsnMarina-Cerritos	14.0
LB-13-S-3	33-45-52N	118-15-06W	AdjEBsnMarina-Cerritos	14.0
LB-14-S-1	33-45-19.5N	118-16-37W	AdjToddShipBldgFlDryDk	14.0
LB-14-S-2	33-45-19.5N	118-16-37W	AdjToddShipBldgFlDryDk	14.0
LB-14-S-3	33-45-19.5N	118-16-37W	AdjToddShipBldgFlDryDk	14.0
LB-15-S-1	33-43-47N	118-16-13W	AdjSWMarinePiers@DryDk	14.0
LB-15-S-2	33-43-47N	118-16-13W	AdjSWMarinePiers@DryDk	14.0
LB-15-S-3	33-43-47N	118-16-13W	AdjSWMarinePiers@DryDk	14.0
LB-16-S-1	33-42-41N	118-14-41W	30mNWofEJetty2MainChnl	16.0
LB-16-S-2	33-42-41N	118-14-41W	30mNWofEJetty2MainChnl	16.0
LB-16-S-3	33-42-41N	118-14-41W	30mNWofEJetty2MainChnl	16.0
LB-17-S-1	33-43-26.5N	118-08-40.5W	50mNWofRecFshg"AnnieB"	17.0

Table B-2(s). Sediment sample station data: LA/Long Beach Harbor (continued).

Sample#	Latitude(N)	Longitude(W)	Location	Depth
LB-17-S-2	33-43-26.5N	118-08-40.5W	50mNWofRecFshg"AnnieB"	17.0
LB-17-S-3	33-43-26.5N	118-08-40.5W	50mNWofRecFshg"AnnieB"	17.0
LB-18-S-1	33-45-33N	118-11-01W	CtrofLBchShorelineMara	8.5
LB-18-S-2	33-45-33N	118-11-01W	CtrofLBchShorelineMara	8.5
LB-18-S-3	33-45-33N	118-11-01W	CtrofLBchShorelineMara	8.5

Table B-2(t). Tissue sample station data: LA/Long Beach Harbor

Sample#	Date	Time	Latitude	Longitude	Remarks
LB-04A-T-1	26Jun85	0845U	33-44-41.5N	118-13-02W	@endofNavyMolefmbouler
LB-04A-T-2	26Jun85	0846U	33-44-41.5N	118-13-02W	@endofNavyMolefmbouler
LB-04A-T-3	26Jun85	0847U	33-44-41.5N	118-13-02W	@endofNavyMolefmbouler
LB-04A-T-4	26Jun85	0848U	33-44-41.5N	118-13-02W	@endofNavyMolefmbouler
LB-04A-T-5	26Jun85	0849U	33-44-41.5N	118-13-02W	@endofNavyMolefmbouler
LB-05A-T-1	25Jun85	0915U	33-45-23.5N	118-13-28W	@Caisson2DryDk#1LBNSYd
LB-05A-T-2	25Jun85	0916U	33-45-23.5N	118-13-28W	@Caisson2DryDk#1LBNSYd
LB-05A-T-3	25Jun85	0917U	33-45-23.5N	118-13-28W	@Caisson2DryDk#1LBNSYd
LB-05A-T-4	25Jun85	0918U	33-45-23.5N	118-13-28W	@Caisson2DryDk#1LBNSYd
LB-05A-T-5	25Jun85	0919U	33-45-23.5N	118-13-28W	@Caisson2DryDk#1LBNSYd
LB-08A-T-1	26Jun85	0858U	33-44-39N	118-14-30.5W	AlongNavyYchtClubShrln
LB-08A-T-2	26Jun85	0859U	33-44-39N	118-14-30.5W	AlongNavyYchtClubShrln
LB-08A-T-3	26Jun85	0900U	33-44-39N	118-14-30.5W	AlongNavyYchtClubShrln
LB-08A-T-4	26Jun85	0901U	33-44-39N	118-14-30.5W	AlongNavyYchtClubShrln
LB-08A-T-5	26Jun85	0902U	33-44-39N	118-14-30.5W	AlongNavyYchtClubShrln
LB-10A-T-1	25Jun85	1038U	33-46-09N	118-12-53W	Adj2InnerHbrMarina&CSB
LB-10A-T-2	25Jun85	1039U	33-46-09N	118-12-53W	Adj2InnerHbrMarina&CSB
LB-10A-T-3	25Jun85	1040U	33-46-09N	118-12-53W	Adj2InnerHbrMarina&CSB
LB-10A-T-4	25Jun85	1041U	33-46-09N	118-12-53W	Adj2InnerHbrMarina&CSB
LB-10A-T-5	25Jun85	1042U	33-46-09N	118-12-53W	Adj2InnerHbrMarina&CSB
LB-12A-T-1	25Jun85	1110U	33-45-57N	118-14-18W	Adj2MarinaSsideHwy47Br
LB-12A-T-2	25Jun85	1111U	33-45-57N	118-14-18W	Adj2MarinaSsideHwy47Br
LB-12A-T-3	25Jun85	1112U	33-45-57N	118-14-18W	Adj2MarinaSsideHwy47Br
LB-12A-T-4	25Jun85	1113U	33-45-57N	118-14-18W	Adj2MarinaSsideHwy47Br
LB-12A-T-5	25Jun85	1114U	33-45-57N	118-14-18W	Adj2MarinaSsideHwy47Br
LB-18-T-1	26Jun85	1112U	33-45-33N	118-11-01W	CtrofLBeachShorelineMa
LB-18-T-2	26Jun85	1113U	33-45-33N	118-11-01W	CtrofLBeachShorelineMa
LB-18-T-3	26Jun85	1114U	33-45-33N	118-11-01W	CtrofLBeachShorelineMa
LB-18-T-4	26Jun85	1115U	33-45-33N	118-11-01W	CtrofLBeachShorelineMa
LB-18-T-5	26Jun85	1116U	33-45-33N	118-11-01W	CtrofLBeachShorelineMa
LB-18A-T-1	26Jun85	1048U	33-45-28N	118-10-57W	@Entr2LBeachShrelineMa
LB-18A-T-2	26Jun85	1049U	33-45-28N	118-10-57W	@Entr2LBeachShrelineMa
LB-18A-T-3	26Jun85	1050U	33-45-28N	118-10-57W	@Entr2LBeachShrelineMa
LB-18A-T-4	26Jun85	1051U	33-45-28N	118-10-57W	@Entr2LBeachShrelineMa
LB-18A-T-5	26Jun85	1052U	33-45-28N	118-10-57W	@Entr2LBeachShrelineMa

Table B-3(w). Water sample station data: San Francisco Bay.

Sample#	Date	Time	Latitude	Longitude	Remarks
SF-01-W-1	19FEB86	1040U	37-46-35.4N	122-17-52.7W	NASAlamedaPtSerBoaths
SF-01-W-2	19FEB86	1041U	37-46-35.4N	122-17-52.7W	NASAlamedaPtSerBoaths
SF-01-W-3	19FEB86	1042U	37-46-35.4N	122-17-52.7W	NASAlamedaPtSerBoaths
SF-02-W-1	19FEB86	1125U	37-47-09.0N	122-14-49.2W	AdjPacDryDk&RepairEsty
SF-02-W-2	19FEB86	1126U	37-47-09.0N	122-14-49.2W	AdjPacDryDk&RepairEsty
SF-02-W-3	19FEB86	1127U	37-47-09.0N	122-14-49.2W	AdjPacDryDk&RepairEsty
SF-03-W-1	19FEB86	1145U	37-46-48.0N	122-14-40.0W	AdjUSCGpierSEendGovtIs
SF-04-W-1	19FEB86	1203U	37-46-47.0N	122-15-18.4W	CntrFortmanBasinMarina
SF-04-W-2	19FEB86	1204U	37-46-47.0N	122-15-18.4W	CntrFortmanBasinMarina
SF-04-W-3	19FEB86	1205U	37-46-47.0N	122-15-18.4W	CntrFortmanBasinMarina
SF-05-W-1	19FEB86	1220U	37-47-32.8N	122-14-46.6W	AdjUSCGWHECpierAlEstry
SF-06-W-1	19FEB86	1241U	37-48-13.0N	122-19-26.0W	NendNSCOaklandPier#4
SF-07-W-1	19FEB86	1305U	37-49-09.1N	122-18-29.4W	NEendOaklndOuterHarbor
SF-07-W-2	19FEB86	1306U	37-49-09.1N	122-18-29.4W	NEendOaklndOuterHarbor
SF-07-W-3	19FEB86	1307U	37-49-09.1N	122-18-29.4W	NEendOaklndOuterHarbor
SF-08-W-1	19FEB86	1330U	37-48-40.6N	122-19-49.0W	@MatsnPiersOkldOutrHbr
SF-09-W-1	19FEB86	1416U	37-46-20.9N	122-18-15.3W	NASAlamedaendCVpier#3
SF-10-W-1	20FEB86	0803U	37-50-21.8N	122-18-40.0W	CenterEmeryvilleMarina
SF-10-W-2	20FEB86	0804U	37-50-21.8N	122-18-40.0W	CenterEmeryvilleMarina
SF-10-W-3	20FEB86	0805U	37-50-21.8N	122-18-40.0W	CenterEmeryvilleMarina
SF-11-W-1	20FEB86	0848U	37-49-49.8N	122-21-57.0W	offT-piersTreasIsldNE
SF-12-W-1	20FEB86	0912U	37-49-21.8N	122-21-38.8W	EsideTreasIsoffnewpier
SF-13-W-1	20FEB86	0927U	37-48-41.0N	122-21-36.8W	@USCDpier-YerbaBuenaIs
SF-13-W-2	20FEB86	0928U	37-48-41.0N	122-21-36.8W	@USCDpier-YerbaBuenaIs
SF-13-W-3	20FEB86	0929U	37-48-41.0N	122-21-36.8W	@USCDpier-YerbaBuenaIs
SF-14-W-1	20FEB86	0946U	37-47-54.9N	122-22-37.5W	offNWsideCtrPileBayBrg
SF-15-W-1	20FEB86	1015U	37-48-28.2N	122-25-05.2W	CtrFishrmn'sWhrfadj#45
SF-15-W-2	20FEB86	1016U	37-48-28.2N	122-25-05.2W	CtrFishrmn'sWhrfadj#45
SF-15-W-3	20FEB86	1017U	37-48-28.2N	122-25-05.2W	CtrFishrmn'sWhrfadj#45
SF-16-W-1	20FEB86	1052U	37-48-27.3N	122-23-58.0W	offNEtipPier#29SanFran
SF-17-W-1	20FEB86	1152U	37-47-32.6N	122-21-25.8W	CenterSFBay~2500mSofYB
SF-17-W-2	20FEB86	1153U	37-47-32.6N	122-21-25.8W	CenterSFBay~2500mSofYB
SF-17-W-3	20FEB86	1154U	37-47-32.6N	122-21-25.8W	CenterSFBay~2500mSofYB
SF-18-W-1	20FEB86	1222U	37-46-37.2N	122-19-47.3W	@NAS Alameda Ch Mkr #3
SF-18-W-2	20FEB86	1223U	37-46-37.2N	122-19-47.3W	@NAS Alameda Ch Mkr #3
SF-18-W-3	20FEB86	1224U	37-46-37.2N	122-19-47.3W	@NAS Alameda Ch Mkr #3

Table B-3(s). Sediment sample station data: San Francisco Bay

Sample#	Latitude(N)	Longitude(W)	Location	Depth
SF-01-S-1	37-46-35.4N	122-17-52.7W	NASAlmdaPtSerBoathouse	4.0
SF-01-S-2	37-46-35.4N	122-17-52.7W	NASAlmdaPtSerBoathouse	4.0
SF-01-S-3	37-46-35.4N	122-17-52.7W	NASAlmdaPtSerBoathouse	4.0
SF-02-S-1	37-47-09.0N	122-14-49.2W	AdjPacDryDk&RepairEsty	6.0
SF-02-S-2	37-47-09.0N	122-14-49.2W	AdjPacDryDk&RepairEsty	6.0
SF-02-S-3	37-47-09.0N	122-14-49.2W	AdjPacDryDk&RepairEsty	6.0
SF-03-S-1	37-46-48.0N	122-14-40.0W	AdjUSCGpierSEendGovtIs	4.0
SF-03-S-2	37-46-48.0N	122-14-40.0W	AdjUSCGpierSEendGovtIs	4.0
SF-03-S-3	37-46-48.0N	122-14-40.0W	AdjUSCGpierSEendGovtIs	4.0
SF-04-S-1	37-46-47.0N	122-15-18.4W	CtrFortmannBasinMarina	4.0
SF-04-S-2	37-46-47.0N	122-15-18.4W	CtrFortmannBasinMarina	4.0
SF-04-S-3	37-46-47.0N	122-15-18.4W	CtrFortmannBasinMarina	4.0
SF-05-S-1	37-47-32.8N	122-16-46.6W	AdjUSCGWHECpierAlEstry	9.0
SF-05-S-2	37-47-32.8N	122-16-46.6W	AdjUSCGWHECpierAlEstry	9.0
SF-05-S-3	37-47-32.8N	122-16-46.6W	AdjUSCGWHECpierAlEstry	9.0
SF-06-S-1	37-48-13.0N	122-19-26.0W	Nend NSC OaklandPier#4	11.0
SF-06-S-2	37-48-13.0N	122-19-26.0W	Nend NSC OaklandPier#4	11.0
SF-06-S-3	37-48-13.0N	122-19-26.0W	Nend NSC OaklandPier#4	11.0
SF-07-S-1	37-49-09.1N	122-18-29.4W	NEendOaklandOuterHarbr	11.0
SF-07-S-2	37-49-09.1N	122-18-29.4W	NEendOaklandOuterHarbr	11.0
SF-07-S-3	37-49-09.1N	122-18-29.4W	NEendOaklandOuterHarbr	11.0
SF-08-S-1	37-48-40.6N	122-19-49.0W	@MatsonPierOkldOutrHbr	11.0
SF-08-S-2	37-48-40.6N	122-19-49.0W	@MatsonPierOkldOutrHbr	11.0
SF-08-S-3	37-48-40.6N	122-19-49.0W	@MatsonPierOkldOutrHbr	11.0
SF-09-S-1	37-46-20.9N	122-18-15.3W	NASAlmda@endofCVPier#3	12.0
SF-09-S-2	37-46-20.9N	122-18-15.3W	NASAlmda@endofCVPier#3	12.0
SF-09-S-3	37-46-20.9N	122-18-15.3W	NASAlmda@endofCVPier#3	12.0
SF-10-S-1	37-50-21.8N	122-18-40.0W	CenterEmeryvilleMarina	4.0
SF-10-S-2	37-50-21.8N	122-18-40.0W	CenterEmeryvilleMarina	4.0
SF-10-S-3	37-50-21.8N	122-18-40.0W	CenterEmeryvilleMarina	4.0
SF-11-S-1	37-49-49.8N	122-21-57.0W	offNET-piersTreasIslnd	6.0
SF-11-S-2	37-49-49.8N	122-21-57.0W	offNET-piersTreasIslnd	6.0
SF-11-S-3	37-49-49.8N	122-21-57.0W	offNET-piersTreasIslnd	6.0
SF-12-S-1	37-49-21.0N	122-21-38.8W	EsideTreasIsoffnewpier	12.0
SF-12-S-2	37-49-21.0N	122-21-38.8W	EsideTreasIsoffnewpier	12.0
SF-12-S-3	37-49-21.0N	122-21-38.8W	EsideTreasIsoffnewpier	12.0
SF-13-S-1	37-48-41.0N	122-21-36.8W	@USCGpier-YerbaBuenaIs	3.0
SF-13-S-2	37-48-41.0N	122-21-36.8W	@USCGpier-YerbaBuenaIs	3.0
SF-13-S-3	37-48-41.0N	122-21-36.8W	@USCGpier-YerbaBuenaIs	3.0
SF-15-S-1	37-48-28.2N	122-25-05.2W	CtrFishrmn'sWhrfadj#45	4.0
SF-15-S-2	37-48-28.2N	122-25-05.2W	CtrFishrmn'sWhrfadj#45	4.0
SF-15-S-3	37-48-28.2N	122-25-05.2W	CtrFishrmn'sWhrfadj#45	4.0
SF-16-S-1	37-48-27.3N	122-23-58.0W	OffNEtipPier#29SanFran	14.0
SF-16-S-2	37-48-27.3N	122-23-58.0W	OffNEtipPier#29SanFran	14.0
SF-16-S-3	37-48-27.3N	122-23-58.0W	OffNEtipPier#29SanFran	14.0
SF-17-S-1	37-47-32.6N	122-21-25.8W	CenterSFBay-2500mSofYB	16.0
SF-17-S-2	37-47-32.6N	122-21-25.8W	CenterSFBay-2500mSofYB	16.0
SF-17-S-3	37-47-32.6N	122-21-25.8W	CenterSFBay-2500mSofYB	16.0
SF-18-S-1	37-46-37.2N	122-19-47.3W	@NAS Alameda Ch Mkr #3	8.0
SF-18-S-2	37-46-37.2N	122-19-47.3W	@NAS Alameda Ch Mkr #3	8.0

Table B-3(s). Sediment sample station data: San Francisco Bay (continued).

Sample#	Latitude(N)	Longitude(W)	Location	Depth
SF-18-S-3	37-46-37.2N	122-19-47.3W	@NAS Alameda Ch Mkr #3	8.0

Table B-3(t). Tissue sample station data: San Francisco Bay.

Sample#	Date	Time	Latitude	Longitude	Remarks
SF-01-T-1	19Feb86	1035U	37-46-35.4N	122-17-52.7W	NASAlmdaPtSerBoathouse
SF-01-T-2	19Feb86	1036U	37-46-35.4N	122-17-52.7W	NASAlmdaPtSerBoathouse
SF-01-T-3	19Feb86	1037U	37-46-35.4N	122-17-52.7W	NASAlmdaPtSerBoathouse
SF-01-T-4	19Feb86	1038U	37-46-35.4N	122-17-52.7W	NASAlmdaPtSerBoathouse
SF-01-T-5	19Feb86	1039U	37-46-35.4N	122-17-52.7W	NASAlmdaPtSerBoathouse
SF-07-T-1	19Feb86	1315U	37-49-09.1N	122-18-29.4W	NEendOaklandOuterHarbr
SF-07-T-2	19Feb86	1316U	37-49-09.1N	122-18-29.4W	NEendOaklandOuterHarbr
SF-07-T-3	19Feb86	1317U	37-49-09.1N	122-18-29.4W	NEendOaklandOuterHarbr
SF-07-T-4	19Feb86	1318U	37-49-09.1N	122-18-29.4W	NEendOaklandOuterHarbr
SF-07-T-5	19Feb86	1319U	37-49-09.1N	122-18-29.4W	NEendOaklandOuterHarbr
SF-11-T-1	20Feb86	0850U	37-49-49.8N	122-21-57.0W	offT-piersNETreasIslnd
SF-11-T-2	20Feb86	0851U	37-49-49.8N	122-21-57.0W	offT-piersNETreasIslnd
SF-11-T-3	20Feb86	0852U	37-49-49.8N	122-21-57.0W	offT-piersNETreasIslnd
SF-11-T-4	20Feb86	0853U	37-49-49.8N	122-21-57.0W	offT-piersNETreasIslnd
SF-11-T-5	20Feb86	0854U	37-49-49.8N	122-21-57.0W	offT-piersNETreasIslnd
SF-14-T-1	20Feb86	0955U	37-47-54.9N	122-22-37.5W	NWsideofBayBrdgLpiling
SF-14-T-2	20Feb86	0956U	37-47-54.9N	122-22-37.5W	NWsideofBayBrdgLpiling
SF-14-T-3	20Feb86	0957U	37-47-54.9N	122-22-37.5W	NWsideofBayBrdgLpiling
SF-14-T-4	20Feb86	0958U	37-47-54.9N	122-22-37.5W	NWsideofBayBrdgLpiling
SF-14-T-5	20Feb86	0959U	37-47-54.9N	122-22-37.5W	NWsideofBayBrdgLpiling

Table B-4(w). Water sample station data: Mare Island Strait.

Sample#	Date	Time	Latitude	Longitude	Remarks
MI-01-W-1	17Apr84	0930U	38-04-12N	122-14-42.5W	EntrChBtwnDikes#9&14
MI-01-W-2	17Apr84	0931U	38-04-12N	122-14-42.5W	EntrChBtwnDikes#9&14
MI-01-W-3	17Apr84	0932U	38-04-12N	122-14-42.5W	EntrChBtwnDikes#9&14
MI-02-W-1	17Apr84	0944U	38-04-31N	122-14-22W	100mEofPier#34USCoGd
MI-03-W-1	17Apr84	1001U	38-05-03.5N	122-14-54W	150mWofSoVallejoTwr
MI-04-W-1	17Apr84	1009U	38-05-15.5N	122-15-11.5W	100moffSouthQuaywall
MI-05-W-1	17Apr84	1021U	38-05-20N	122-15-22.5W	20moffPier#22/SBU-11
MI-06-W-1	17Apr84	1036U	38-05-35N	122-15-22.5W	150mWofOilRigConstr
MI-06-W-2	17Apr84	1037U	38-05-35N	122-15-22.5W	150mWofOilRigConstr
MI-06-W-3	17Apr84	1038U	38-05-35N	122-15-22.5W	150mWofOilRigConstr
MI-07-W-1	17Apr84	1042U	38-05-41N	122-15-42W	50mEofDryDock#4Caisn
MI-07-W-2	17Apr84	1043U	38-05-41N	122-15-42W	50mEofDryDock#4Caisn
MI-07-W-3	17Apr84	1044U	38-05-41N	122-15-42W	50mEofDryDock#4Caisn
MI-08-W-1	17Apr84	1052U	38-05-44N	122-15-48.5W	25mSEofDryDock#3Cais
MI-09-W-1	17Apr84	1103U	38-05-52N	122-15-52.5W	50moffquay@DryDock#3
MI-10-W-1	17Apr84	1111U	38-06-03N	122-15-49W	50mWofMIferryslp-Vjo
MI-10-W-2	17Apr84	1113U	38-06-03N	122-15-49W	50mWofMIferryslp-Vjo
MI-10-W-3	17Apr84	1115U	38-06-03N	122-15-49W	50mWofMIferryslp-Vjo
MI-11-W-1	17Apr84	1124U	38-06-02N	122-15-03W	20mWofMIferryslp-MIs
MI-12-W-1	17Apr84	1134U	38-06-18N	122-15-57W	VallejoYachtClub-ctr
MI-12-W-2	17Apr84	1135U	38-06-18N	122-15-57W	VallejoYachtClub-ctr
MI-12-W-3	17Apr84	1136U	38-06-18N	122-15-57W	VallejoYachtClub-ctr
MI-13-W-1	17Apr84	1153U	38-06-18N	122-16-16W	50m off USS Nautilus
MI-14-W-1	17Apr84	1201U	38-06-32N	122-16-11W	VallejoMarinaSoEntr.
MI-15-W-1	17Apr84	1215U	38-06-41N	122-16-15W	VallejoMarina-No.End
MI-15-W-2	17Apr84	1216U	38-06-41N	122-16-15W	VallejoMarina-No.End
MI-15-W-3	17Apr84	1217U	38-06-41N	122-16-15W	VallejoMarina-No.End
MI-16-W-1	17Apr84	1221U	38-06-37.5N	122-16-15W	VallejoMarinaNoEntr.
MI-17-W-1	17Apr84	1230U	38-06-40N	122-16-25.5W	Mare Island Causeway
MI-18-W-1	17Apr84	1243U	38-07-14N	122-16-46W	NapaRiverBridge-Cntr
MI-18-W-2	17Apr84	1244U	38-07-14N	122-16-46W	NapaRiverBridge-Cntr
MI-18-W-3	17Apr84	1245U	38-07-14N	122-16-46W	NapaRiverBridge-Cntr

Table B-4(s). Sediment sample station data: Mare Island Strait.

Sample#	Latitude(N)	Longitude(W)	Location	Depth
MI-01-S-1	38-04-12N	122-14-42.5W	EntrChBtwnDikes#9&14	11.0
MI-01-S-2	38-04-12N	122-14-42.5W	EntrChBtwnDikes#9&14	11.0
MI-01-S-3	38-04-12N	122-14-42.4W	EntrChBtwnDikes#9&14	11.0
MI-02-S-1	38-04-31N	122-14-42W	100mEPier#34USCOGARD	10.1
MI-02-S-2	38-04-31N	122-14-42W	100mEPier#34USCOGARD	10.1
MI-02-S-3	38-04-31N	122-14-42W	100mEPier#34USCOGARD	10.1
MI-03-S-1	38-05-03.5N	122-14-54W	100mWofS.VallejoTwr	2.7
MI-03-S-2	38-05-03.5N	122-14-54W	100mWofS.VallejoTwr	2.7
MI-03-S-3	38-05-03.5N	122-14-54W	100mWofS.VallejoTwr	2.7
MI-04-S-1	38-05-15.5N	122-15-11.5W	100moff So. quaywall	10.3
MI-04-S-2	38-05-15.5N	122-15-11.5W	100moff So. quaywall	10.3
MI-04-S-3	38-05-15.5N	122-15-11.5W	100moff So. quaywall	10.3
MI-05-S-1	38-05-20N	122-15-22.5W	20moffPier#22 SBU-11	6.7
MI-05-S-2	38-05-20N	122-15-22.5W	20moffPier#22 SBU-11	6.7
MI-05-S-3	38-05-20N	122-15-22.5W	20moffPier#22 SBU-11	6.7
MI-06-S-1	38-05-35N	122-15-22.5W	150mWOilRig-Vajoside	3.7
MI-06-S-2	38-05-35N	122-15-22.5W	150mWOilRig-Vajoside	3.7
MI-06-S-3	38-05-35N	122-15-22.5W	150mWOilRig-Vajoside	3.7
MI-07-S-1	38-05-41N	122-15-42W	50mEDryDock#4Caisson	11.0
MI-07-S-2	38-05-41N	122-15-42W	50mEDryDock#4Caisson	11.0
MI-07-S-3	38-05-41N	122-15-42W	50mEDryDock#4Caisson	11.0
MI-08-S-1	38-05-44N	122-15-48W	25mSEDryDock#3Caisso	9.1
MI-08-S-2	38-05-44N	122-15-48W	25mSEDryDock#3Caisso	9.1
MI-08-S-3	38-05-44N	122-15-48W	25mSEDryDock#3Caisso	9.1
MI-09-S-1	38-05-52N	122-15-52.5W	50moffquayadjDryDk#2	11.0
MI-09-S-2	38-05-52N	122-15-52.5W	50moffquayadjDryDk#2	11.0
MI-09-S-3	38-05-52N	122-15-52.5W	50moffquayadjDryDk#2	11.0
MI-10-S-1	38-06-03N	122-15-49W	50mW MIFerrySlpEside	3.1
MI-10-S-2	38-06-03N	122-15-49W	50mW MIFerrySlpEside	3.1
MI-10-S-3	38-06-03N	122-15-49W	50mW MIFerrySlpEside	3.1
MI-11-S-1	38-06-02N	122-16-03W	20mWMIFerryDkMIsSide	4.3
MI-11-S-2	38-06-02N	122-16-03W	20mWMIFerryDkMIsSide	4.3
MI-11-S-3	38-06-02N	122-16-03W	20mWMIFerryDkMIsSide	4.3
MI-12-S-1	38-06-18N	122-15-57W	VallejoYachtClub-Mid	3.1
MI-12-S-2	38-06-18N	122-15-57W	VallejoYachtClub-Mid	3.1
MI-12-S-3	38-06-18N	122-15-57W	VallejoYachtClub-Mid	3.1
MI-13-S-1	38-06-18N	122-16-16W	50moffUSSNautilus	10.1
MI-13-S-2	38-06-18N	122-16-16W	50moffUSSNautilus	10.1
MI-13-S-3	38-06-18N	122-16-16W	50moffUSSNautilus	10.1
MI-14-S-1	38-06-32N	122-16-11W	VallejoMarinaSoEntr	2.1
MI-14-S-2	38-06-32N	122-16-11W	VallejoMarinaSoEntr	2.1
MI-14-S-3	38-06-32N	122-16-11W	VallejoMarinaSoEntr	2.1
MI-15-S-1	38-06-41N	122-16-15W	VallejoMarinaNoEnd	2.1
MI-15-S-2	38-06-41N	122-16-15W	VallejoMarinaNoEnd	2.1
MI-15-S-3	38-06-41N	122-16-15W	VallejoMarinaNoEnd	2.1
MI-16-S-1	38-06-37.5N	122-16-15W	VallejoMarinaNoEntr	2.4
MI-16-S-2	38-06-37.5N	122-16-15W	VallejoMarinaNoEntr	2.4
MI-16-S-3	38-06-37.5N	122-16-15W	VallejoMarinaNoEntr	2.4
MI-17-S-1	38-06-40N	122-16-25.5W	MareIsCausewayCntrPr	7.9
MI-17-S-2	38-06-40N	122-16-25.5W	MareIsCausewayCntrPr	7.9

Table B-4(s). Sediment sample station data: Mare Island Strait (continued).

Sample#	Latitude(N)	Longitude(W)	Location	Depth
MI-17-S-3	38-06-40N	122-16-25.5W	MareIsCausewayCntrPr	7.9
MI-18-S-1	38-07-14N	122-16-46W	Napa River BridgeCtr	8.2
MI-18-S-2	38-07-14N	122-16-46W	Napa River BridgeCtr	8.2
MI-18-S-3	38-07-14N	122-16-46W	Napa River BridgeCtr	8.2

Table B-5(w). Water sample station data: Bremerton.

Sample#	Date	Time	Latitude	Longitude	Remarks
BR-01-W-1	14Jun85	1008U	47-33-57N	122-36-44W	50mSofMkr#12offPtHeron
BR-01-W-2	14Jun85	1009U	47-33-57N	122-36-44W	50mSofMkr#12offPtHeron
BR-01-W-3	14Jun85	1010U	47-33-57N	122-36-44W	50mSofMkr#12offPtHeron
BR-02-W-1	14Jun85	1042U	47-33-51N	122-37-18W	20mEofBremrtnFerrySlip
BR-02-W-2	14Jun85	1043U	47-33-51N	122-37-18W	20mEofBremrtnFerrySlip
BR-02-W-3	14Jun85	1044U	47-33-51N	122-37-18W	20mEofBremrtnFerrySlip
BR-03-W-1	14Jun85	1100U	47-33-15N	122-37-26W	MidChbtwnBrem&PortOrcd
BR-04-W-1	14Jun85	1118U	47-33-13N	122-36-17W	15mNWofRA TargetNWof#3
BR-04-W-2	14Jun85	1119U	47-33-13N	122-36-17W	15mNWofRA TargetNWof#3
BR-04-W-3	14Jun85	1120U	47-33-13N	122-36-17W	15mNWofRA TargetNWof#3
BR-05-W-1	14Jun85	1134U	47-32-41N	122-38-09W	CtrofPortOrchardMarina
BR-05-W-2	14Jun85	1135U	47-32-41N	122-38-09W	CtrofPortOrchardMarina
BR-05-W-3	14Jun85	1136U	47-32-41N	122-38-09W	CtrofPortOrchardMarina
BR-06-W-1	14Jun85	1205U	47-32-23N	122-38-41W	CtrPortOrchardYachtClb
BR-07-W-1	14Jun85	1215U	47-32-40N	122-38-53W	500mNNWOrchardYachtClb
BR-08-W-1	14Jun85	1228U	47-32-03N	122-40-30W	200mWNWSheltonIsBoatWx
BR-09-W-1	14Jun85	1235U	47-31-57N	122-40-19W	CenterSheltonIsBoatWrx
BR-09-W-2	14Jun85	1236U	47-31-57N	122-40-19W	CenterSheltonIsBoatWrx
BR-09-W-3	14Jun85	1237U	47-31-57N	122-40-19W	CenterSheltonIsBoatWrx
BR-10-W-1	14Jun85	1250U	47-32-47N	122-40-03W	@Epilings@BremertonSTP
BR-10-W-2	14Jun85	1251U	47-32-47N	122-40-03W	@Epilings@BremertonSTP
BR-10-W-3	14Jun85	1252U	47-32-47N	122-40-03W	@Epilings@BremertonSTP
BR-11-W-1	14Jun85	1301U	47-33-06N	122-39-05W	10masternofAFDMInacShp
BR-12-W-1	14Jun85	1316U	47-33-10N	122-38-31W	10moffDryDk#6w/[LHA-3]
BR-13-W-1	14Jun85	1326U	47-33-27N	122-38-13W	10moffDryDk#5[midpier]
BR-14-W-1	14Jun85	1340U	47-33-09N	122-38-12W	100mWestofPier#4PSNSYD
BR-15-W-1	14Jun85	1351U	47-33-35N	122-38-02W	10moffcaissonofDryDk#2
BR-15-W-2	14Jun85	1352U	47-33-35N	122-38-02W	10moffcaissonofDryDk#2
BR-15-W-3	14Jun85	1353U	47-33-35N	122-38-02W	10moffcaissonofDryDk#2
BR-16-W-1	14Jun85	1402U	47-33-25N	122-37-48W	MdwybtwnPiers#5&6PSNSY
BR-17-W-1	14Jun85	1408U	47-33-39N	122-37-48W	10moffcaissontoDryDk#1
BR-18-W-1	14Jun85	1421U	47-33-33N	122-37-44W	10moffEastPierstoPSNSY

[illegible] station data: Bremerton.

Sample#	Latitude([illegible])	Lo[illegible])	Location	Depth
BR-01-S-1	47-33-57N	122-[illegible]-44W	50mSofMkr#12@PtHeron	10.0
BR-01-S-2	47-33-57N	122-[illegible]-44W	50mSofMkr#12@PtHeron	10.0
BR-01-S-3	47-33-57N	122-[illegible]-44W	50mSofMkr#12@PtHeron	10.0
BR-02-S-1	47-33-51N	122-37-18W	20mEofBrmtnFerrySlip	8.0
BR-02-S-2	47-33-51N	122-37-18W	20mEofBrmtnFerrySlip	8.0
BR-02-S-3	47-33-51N	122-37-18W	20mEofBrmtnFerrySlip	8.0
BR-03-S-1	47-33-15N	122-37-26W	MidChbtwnBrem&PtOrcd	16.8
BR-03-S-2	47-33-15N	122-37-26W	MidChbtwnBrem&PtOrcd	17.0
BR-03-S-3	47-33-15N	122-37-26W	MidChbtwnBrem&PtOrcd	18.3
BR-04-S-1	47-33-13N	122-36-17W	15mNWofRA TargetNW#3	3.5
BR-04-S-2	47-33-13N	122-36-17W	15mNWofRA TargetNW#3	3.5
BR-04-S-3	47-33-13N	122-36-17W	15mNWofRA TargetNW#3	3.5
BR-05-S-1	47-32-41N	122-38-09W	CtrofPtOrchardMarina	5.5
BR-05-S-2	47-32-41N	122-38-09W	CtrofPtOrchardMarina	5.5
BR-05-S-3	47-32-41N	122-38-09W	CtrofPtOrchardMarina	5.5
BR-06-S-1	47-32-23N	122-38-41W	CtrofPtOrchrdYachtCl	5.5
BR-06-S-2	47-32-23N	122-38-41W	CtrofPtOrchrdYachtCl	5.5
BR-06-S-3	47-32-23N	122-38-41W	CtrofPtOrchrdYachtCl	5.5
BR-07-S-1	47-32-40N	122-38-53W	500mNWofPtOchdYchtCl	11.5
BR-07-S-2	47-32-40N	122-38-53W	500mNWofPtOchdYchtCl	11.5
BR-07-S-3	47-32-40N	122-38-53W	500mNWofPtOchdYchtCl	11.5
BR-08-S-1	47-32-03N	122-40-30W	200mWNWofShltnBoatWx	6.4
BR-08-S-2	47-32-03N	122-40-30W	200mWNWofShltnBoatWx	6.4
BR-08-S-3	47-32-03N	122-40-30W	200mWNWofShltnBoatWx	6.4
BR-09-S-1	47-31-57N	122-40-19W	CtrofSheltonBoatWorx	5.2
BR-09-S-2	47-31-57N	122-40-19W	CtrofSheltonBoatWorx	5.2
BR-09-S-3	47-31-57N	122-40-19W	CtrofSheltonBoatWorx	5.2
BR-10-S-1	47-32-47N	122-40-03W	Epilings@BremertnSTP	9.5
BR-10-S-2	47-32-47N	122-40-03W	@Epilings@BremrtnSTP	9.5
BR-10-S-3	47-32-47N	122-40-03W	@Epilings@BremrtnSTP	9.5
BR-11-S-1	47-33-06N	122-39-05W	10mAstrnofAFDMInAcSF	14.3
BR-11-S-2	47-33-06N	122-39-05W	10mAstrnofAFDMInAcSF	14.3
BR-11-S-3	47-33-06N	122-39-05W	10mAstrnofAFDMInAcSF	14.3
BR-12-S-1	47-33-10N	122-38-31W	10moffDryDk#6[LHA-3]	18.3
BR-12-S-2	47-33-10N	122-[illegible]-31W	10moffDryDk#6[LHA-3]	18.3
BR-12-S-3	47-33-10N	122-38-[illegible]	10moffDryDk#6[LHA-3]	18.3
BR-13-S-1	47-33-27N	[illegible]	10moffDryDk#5midpier	7.3
BR-13-S-2	47-33-27N	[illegible]	10moffDryDk#5midpier	7.3
BR-13-S-3	47-33-27N	[illegible]	10moffDryDk#5midpier	7.3
BR-14-S-1	47-33-09N	[illegible]	100mWofPier#4[PSNSY]	15.5
BR-14-S-2	47-33-09N	122-3[illegible]-12W	100mWofPier#4[PSNSY]	15.5
BR-14-S-3	47-33-09N	122-38-12W	100mWofPier#4[PSNSY]	15.5
BR-15-S-1	47-33-35N	122-38-02W	10mfmCaisson2DryDk#4	12.5
BR-15-S-2	47-33-35N	122-38-02W	10mfmCaisson2DryDk#4	12.5
BR-15-S-3	47-33-35N	122-38-02W	10mfmCaisson2DryDk#4	12.5
BR-16-S-1	47-33-25N	122-37-49W	MdwybtwnPiers#5and#6	16.0
BR-16-S-2	47-33-25N	122-37-48W	MdwybtwnPiers#5and#6	16.0
BR-16-S-3	47-33-25N	122-37-48W	MdwybtwnPiers#5and#6	16.0
BR-17-S-1	47-33-39N	122-37-48W	10mfmCaisson4Drydk#1	10.0
BR-17-S-2	47-33-39N	122-37-48W	10mfmCaisson4Drydk#1	10.0

Table B-5(s). Sediment sample station data: Bremerton (continued).

Sample#	Latitude(N)	Longitude(W)	Location	Depth
BR-17-S-3	47-33-39N	122-37-48W	10mfmCaisson4Drydk#1	10.0
BR-18-S-1	47-33-33N	122-37-44W	10mfmEastPiers@PSNSY	14.0
BR-18-S-2	47-33-33N	122-37-44W	10mfmEastPiers@PSNSY	14.0
BR-18-S-3	47-33-33N	122-37-44W	10mfmEastPiers@PSNSY	14.0

Table B-5(t). Tissue sample station data: Bremerton.

Sample#	Date	Time	Latitude	Longitude	Remarks
BR-01-T-1	14Jun85	1015U	47-33-57N	122-36-44W	50mSofMkr#12offPtHeron
BR-01-T-2	14Jun85	1016U	47-33-57N	122-36-44W	50mSofMkr#12offPtHeron
BR-01-T-3	14Jun85	1017U	47-33-57N	122-36-44W	50mSofMkr#12offPtHeron
BR-01-T-4	14Jun85	1018U	47-33-57N	122-36-44W	50mSofMkr#12offPtHeron
BR-01-T-5	14Jun85	1019U	47-33-57N	122-36-44W	50mSofMkr#12offPtHeron
BR-02-T-1	14Jun85	1055U	47-33-51N	122-37-18W	20mEofBremrtnFerrySlip
BR-02-T-2	14Jun85	1056U	47-33-51N	122-37-18W	20mEofBremrtnFerrySlip
BR-02-T-3	14Jun85	1057U	47-33-51N	122-37-18W	20mEofBremrtnFerrySlip
BR-02-T-4	14Jun85	1058U	47-33-51N	122-37-18W	20mEofBremrtnFerrySlip
BR-02-T-5	14Jun85	1059U	47-33-51N	122-37-18W	20mEofBremrtnFerrySlip
BR-05-T-1	14Jun85	1145U	47-33-13N	122-36-17W	20mEofBremrtnFerrySlip
BR-05-T-2	14Jun85	1146U	47-33-13N	122-36-17W	15mNWof"RA"TargetNWo#3
BR-05-T-3	14Jun85	1147U	47-33-13N	122-36-17W	15mNWof"RA"TargetNWo#3
BR-05-T-4	14Jun85	1148U	47-33-13N	122-36-17W	15mNWof"RA"TargetNWo#3
BR-05-T-5	14Jun85	1149U	47-33-13N	122-36-17W	15mNWof"RA"TargetNWo#3
BR-13-T-1	14Jun85	1335U	47-33-27N	122-38-13W	10moffDryDock#5Midpier
BR-13-T-2	14Jun85	1336U	47-33-27N	122-38-13W	10moffDryDock#5Midpier
BR-13-T-3	14Jun85	1337U	47-33-27N	122-38-13W	10moffDryDock#5Midpier
BR-13-T-4	14Jun85	1338U	47-33-27N	122-38-13W	10moffDryDock#5Midpier
BR-13-T-5	14Jun85	1339U	47-33-27N	122-38-13W	10moffDryDock#5Midpier

Table B-6(w). Water sample station data: Pearl Harbor.

Sample#	Date	Time	Latitude	Longitude	Remarks
PH1-01-W-1	27Mar84	1144W	21-19-15.5N	157-58-02W	EntrCh100mWofSubNetP
PH1-02-W-1	27Mar84	1204W	21-19-33N	157-57-57.5W	NofAbndFerrySlpFtKam
PH1-03-W-1	27Mar84	1214W	21-19-51N	157-58-11W	100w of Bishop Point
PH1-04-W-1	27Mar84	1308W	21-20-27.5N	157-58-20.5W	100mSW of Waipio Pt
PH1-05-W-1	27Mar84	1324W	21-20-55.5N	157-58-06W	100mSWChMkr#16HospPt
PH1-05-W-2	27Mar84	1338W	21-20-55.5N	157-58-06W	100mSWChMkr#16HospPt
PH1-05-W-3	27Mar84	1339W	21-20-55.5N	157-58-06W	100mSWChMkr#16HospPt
PH1-06-W-1	27Mar84	1334W	21-21-25.5N	157-58-04.5W	150mSWNOSCucosmFordI
PH1-07-W-1	27Mar84	1414W	21-21-09.5N	157-57-33W	50mNEDryDock#2PHNSYD
PH1-08-W-1	27Mar84	1428W	21-21-15N	157-57-23W	20mWofPier#B-2PHNSYD
PH1-09-W-1	27Mar84	1438W	21-21-25.5N	157-57-15W	30moffNEend1010Dock
PH1-09-W-2	27Mar84	1056W	21-21-25.5N	157-57-15W	30moffNEend1010Dock
PH1-09-W-3	27Mar84	1057W	21-21-25.5N	157-57-15W	30moffNEend1010Dock
PH1-10-W-1	27Mar84	1448W	21-21-17N	157-57-02W	25moffNendPierB-22
PH1-11-W-1	28Mar84	1104W	21-21-08N	157-56-40.5W	@MerryPt25moffM2-M3
PH1-12-W-1	28Mar84	1109W	21-21-25N	157-56-39.5W	100mSWofSubaseAFDM
PH1-13-W-1	28Mar84	1124W	21-21-36.5N	157-56-51W	30mSWNavSupCen #K-8
PH1-14-W-1	28Mar84	1349W	21-22-13.5N	157-56-15W	RainbowMarine1stSSlP
PH1-14-W-2	28Mar84	1350W	21-22-13.5N	157-56-15W	RainbowMarina1stSSlp
PH1-14-W-3	28Mar84	1351W	21-22-13.5N	157-56-15W	RainbowMarina1stSSlp
PH1-15-W-1	28Mar84	1134W	21-22-09N	157-56-52W	30mSWBuoy#25(NEFordI
PH1-15-W-2	28Mar84	1135W	21-22-09N	157-56-52W	30mSWBuoy#25(NEFordI
PH1-15-W-3	28Mar84	1136W	21-22-09N	157-56-52W	30mSWBuoy#25(NEFordI
PH1-16-W-1	28Mar84	1153W	21-22-59N	157-57-39W	@endHECoSheetPiling
PH1-16-W-2	28Mar84	1154W	21-22-59N	157-57-39W	@endHECoSheetPiling
PH1-16-W-3	28Mar84	1155W	21-22-59N	157-57-39W	@endHECoSheetPiling
PH1-16A-W-1	28Mar84	1209W	21-23-14.5N	157-57-40W	HECoWaiau in dischge
PH1-16A-W-2	28Mar84	1210W	21-23-14.5N	157-57-40W	HECoWaiau in dischge
PH1-17-W-1	28Mar84	1215W	21-22-14.5N	157-57-37.5W	50moffPiersF-12/F-13
PH1-18-W-1	28Mar84	1228W	21-22-09N	157-58-10W	50moffPiersV-2/V-3Pt
PH1-19-W-1	28Mar84	1315W	21-22-33N	157-59-05.5W	MiddleLochInActShpMn
PH1-20-W-1	28Mar84	1325W	21-21-29N	157-58-22W	SWendFordIsAdjBuoy36
PH1-20-W-2	28Mar84	1326W	21-21-29N	157-58-22W	SWendFordIsAdjBuoy36
PH1-20-W-3	28Mar84	1327W	21-21-29N	157-58-22W	SWendFordIsAdjBuoy36

Table B-6(s). Sediment sample station data: Pearl Harbor

Sample#	Latitude(N)	Longitude(W)	Location	Depth
PH1-01-S-1	21-19-15.5N	157-58-02W	EntrCh100mWofSubNetP	10.7
PH1-01-S-2	21-19-15.5N	157-58-02W	EntrCh100mWofSubNetP	10.7
PH1-01-S-3	21-19-15.5N	157-58-02W	EntrCh100mWofSubNetP	10.7
PH1-02-S-1	21-19-33N	157-57-57.5W	NofAbndFerrySlpFtKam	9.1
PH1-02-S-2	21-19-33N	157-57-57.5W	NofAbndFerrySlpFtKam	9.1
PH1-02-S-3	21-19-33N	157-57-57.5W	NofAbndFerrySlpFtKam	9.1
PH1-03-S-1	21-19-51N	157-58-11W	100w of Bishop Point	12.8
PH1-03-S-2	21-19-51N	157-58-11W	100w of Bishop Point	12.8
PH1-03-S-3	21-19-51N	157-58-11W	100w of Bishop Point	12.8
PH1-04-S-1	21-20-27.5N	157-58-20.5W	100mSW of Waipio Pt	9.8
PH1-04-S-2	21-20-27.5N	157-58-20.5W	100mSW of Waipio Pt	9.8
PH1-04-S-3	21-20-27.5N	157-58-20.5W	100mSW of Waipio Pt	9.8
PH1-05-S-1	21-20-55.5N	157-58-06W	100mSWChMkr#16HospPt	13.7
PH1-05-S-2	21-20-55.5N	157-58-06W	100mSWChMkr#16HospPt	13.7
PH1-05-S-3	21-20-55.5N	157-58-06W	100mSWChMkr#16HospPt	13.7
PH1-06-S-1	21-21-25.5N	157-58-04.5W	150mSWNOSCucosmFordI	6.1
PH1-06-S-2	21-21-25.5N	157-58-04.5W	150mSWNOSCucosmFordI	6.1
PH1-06-S-3	21-21-25.5N	157-58-04.5W	150mSWNOSCucosmFordI	6.1
PH1-07-S-1	21-21-09.5N	157-57-33W	50mNEDryDock#2PHNSYD	9.1
PH1-07-S-2	21-21-09.5N	157-57-33W	50mNEDryDock#2PHNSYD	9.1
PH1-07-S-3	21-21-09.5N	157-57-33W	50mNEDryDock#2PHNSYD	9.1
PH1-08-S-1	21-21-15N	157-57-23W	20mWofPier#B-2PHNSYD	10.7
PH1-08-S-2	21-21-15N	157-57-23W	20mWofPier#B-2PHNSYD	10.7
PH1-08-S-3	21-21-15N	157-57-23W	20mWofPier#B-2PHNSYD	10.7
PH1-09-S-1	21-21-25.5N	157-57-15W	30moffNEend1010Dock	12.2
PH1-09-S-2	21-21-25.5N	157-57-15W	30moffNEend1010Dock	12.2
PH1-09-S-3	21-21-25.5N	157-57-15W	30moffNEend1010Dock	12.2
PH1-10-S-1	21-21-17N	157-57-02W	25moffNendPierB-22	10.7
PH1-10-S-2	21-21-17N	157-57-02W	25moffNendPierB-22	10.7
PH1-10-S-3	21-21-17N	157-57-02W	25moffNendPierB-22	10.7
PH1-11-S-1	21-21-08N	157-56-40.5W	@MerryPt25moffM2-M3	12.2
PH1-11-S-2	21-21-08N	157-56-40.5W	@MerryPt25moffM2-M3	12.2
PH1-11-S-3	21-21-08N	157-56-40.5W	@MerryPt25moffM2-M3	12.2
PH1-12-S-1	21-21-25N	157-56-39.5W	100mSWofSubaseAFDM	9.1
PH1-12-S-2	21-21-25N	157-56-39.5W	100mSWofSubaseAFDM	9.1
PH1-12-S-3	21-21-25N	157-56-39.5N	100mSWofSubaseAFDM	9.1
PH1-13-S-1	21-21-36.5N	157-56-51W	30mSWNavSupCen #K-8	10.7
PH1-13-S-2	21-21-36.5N	157-56-51W	30mSWNavSupCen #K-8	10.7
PH1-13-S-3	21-21-36.5N	157-56-51W	30mSWNavSupCen #K-8	10.7
PH1-14-S-1	21-22-13.5N	157-56-15W	RainbowMarina1stSlip	6.1
PH1-14-S-2	21-22-13.5N	157-56-15W	RainbowMarina1stSlip	6.1
PH1-14-S-3	21-22-13.5N	157-56-15W	RainbowMarina1stSlip	6.1
PH1-15-S-1	21-22-09N	157-56-52W	30mSWBuoy#25NEFordIs	13.7
PH1-15-S-2	21-22-09N	157-56-52W	30mSWBuoy#25NEFordIs	13.7
PH1-15-S-3	21-22-09N	157-56-52W	30mSWBuoy#25NEFordIs	13.7
PH1-16-S-1	21-22-59N	157-57-39W	@endHECoSheetPiling	6.1
PH1-16-S-2	21-22-59N	157-57-39W	@endHECoSheetPiling	6.1
PH1-16-S-3	21-22-59N	157-57-39W	@endHECoSheetPiling	6.1
PH1-17-S-1	21-22-14.5N	157-57-37.5W	50moffPiersF-12/F-13	11.6
PH1-17-S-2	21-22-14.5N	157-57-37.5W	50moffPiersF-12/F-13	11.6

Table B-6(s). Sediment sample station data: Pearl Harbor (continued).

Sample#	Latitude(N)	Longitude(W)	Location	Depth
PH1-17-S-3	21-22-14.5N	157-57-37.5W	50moffPiersF-12/F-13	11.6
PH1-18-S-1	21-22-09N	157-58-10W	50moffPiersV-2/V-3Pt	10.7
PH1-18-S-2	21-22-09N	157-58-10W	50moffPiersV-2/V-3Pt	10.7
PH1-18-S-3	21-22-09N	157-58-10W	50moffPiersV-2/V-3Pt	10.7
PH1-19-S-1	21-22-33N	157-59-05.5W	MiddleLochInActShpMn	9.1
PH1-19-S-2	21-22-33N	157-59-05.5W	MiddleLochInActShpMn	9.1
PH1-19-S-3	21-22-33N	157-59-05.5W	MiddleLochInActShpMn	9.1
PH1-20-S-1	21-21-29N	157-58-22W	SWendFordIsAdjBuoy36	10.7
PH1-20-S-2	21-21-29N	157-58-22W	SWendFordIsAdjBuoy36	10.7
PH1-20-S-3	21-21-29N	157-58-22W	SWendFordIsAdjBuoy36	10.7

Table B-6(t). Tissue sample station data: Pearl Harbor

Sample#	Date	Time	Latitude	Longitude	Remarks
PH-3A-T-1	04Apr84	1230W	21-21-44N	158-00-04W	WestLochEShoreMangrv
PH-3A-T-2	04Apr84	1231W	21-21-44N	158-00-04W	WestLochEShoreMangrv
PH-3A-T-3	04Apr84	1232W	21-21-44N	158-00-04W	WestLochEShoreMangrv
PH-3A-T-4	04Apr84	1233W	21-21-44N	158-00-04W	WestLochEShoreMangrv
PH-3A-T-5	04Apr84	1233W	21-21-44N	158-00-04W	WestLochEShoreMangrv
PH-5A-T-1	29Mar84	1400W	21-20-43.5N	157-58-19W	Baylet btwn W23-W25
PH-5A-T-2	29Mar84	1401W	21-20-43.5N	157-58-19W	Baylet btwn W23-W25
PH-5A-T-3	29Mar84	1402W	21-20-43.5N	157-58-19W	Baylet btwn W23-W25
PH-5A-T-4	29Mar84	1403W	21-20-43.5N	157-58-19W	Baylet btwn W23-W25
PH-5A-T-5	29Mar84	1404W	21-20-43.5N	157-58-19W	Baylet btwn W23-W25
PH-6A-T-1	29Mar84	1230W	21-21-30.5N	157-58-05W	WsideFordIsAirFieldA
PH-6A-T-2	29Mar84	1231W	21-21-30.5N	157-58-05W	WsideFordIsAirFieldA
PH-6A-T-3	29Mar84	1232W	21-21-30.5N	157-58-05W	WsideFordIsAirFieldA
PH-6A-T-4	29Mar84	1233W	21-21-30.5N	157-58-05W	WsideFordIsAirFieldA
PH-6A-T-5	29Mar84	1234W	21-21-30.5N	157-58-05W	WsideFordIsAirFieldA
PH-16B-T-1	29Mar84	1445W	21-23-02N	157-57-41W	WsideHECoSheetPiling
PH-16B-T-2	29Mar84	1448W	21-23-02N	157-57-41W	WsideHECoSheetPiling
PH-16B-T-3	29Mar84	1451W	21-23-02N	157-57-41W	WsideHECoSheetPiling
PH-16B-T-4	29Mar84	1454W	21-23-02N	157-57-41W	WsideHECoSheetPiling
PH-16B-T-5	29Mar84	1457W	21-23-02N	157-57-41W	WsideHECoSheetPiling
PH-14A-T-1	04Apr84	1400W	21-22-30N	157-56-29W	McGrewPt-N point
PH-14A-T-2	04Apr84	1402W	21-22-30N	157-56-29W	McGrewPt-N point
PH-14A-T-3	04Apr84	1404W	21-22-30N	157-56-29W	McGrewPt-N point
PH-14A-T-4	04Apr84	1406W	21-22-30N	157-56-29W	McGrewPt-N point
PH-14A-T-5	04Apr84	1408W	21-22-30N	157-56-29W	McGrewPt-N point

Table B-7(w). Water sample station data: Honolulu

Sample#	Date	Time	Latitude	Longitude	Remarks
HH-01A-W-1	05Apr84	1042W	21-19-04.5N	157-53-26.5W	NEpier@DrawBrdge-NCh
HH-01A-W-2	05Apr84	1043W	21-19-04.5N	157-53-26.5W	NEpier@DrawBrdge-NCh
HH-01A-W-3	05Apr84	1044W	21-19-04.5N	157-53-26.5W	NEpier@DrawBrdge-NCh
HH-02-W-1	05Apr84	1110W	21-19-18N	157-53-07W	20mSofDil-HamFlDDock
HH-03-W-1	05Apr84	1130W	21-18-47N	157-52-39.5W	OffSEendofMatsonPier
HH-04-W-1	05Apr84	1220W	21-18-30N	157-52-02.5W	AdjPier#7-@HECoDChrg
HH-05-W-1	05Apr84	1230W	21-18-12.5N	157-52-15W	150mEHonoHbrLiteEntr
HH-06-W-1	05Apr84	1248W	21-17-14.5N	157-51-33.5W	KewaloBsn-@lngstpier
HH-07-W-1	05Apr84	1300W	21-17-16.5N	157-51-41W	KewaloBsn-@HTPkrsRWy
HH-08-W-1	05Apr84	1330W	21-17-10N	157-51-45.5W	KewaloBsn-@MidEntrCh

Table B-7(s). Sediment sample station data. Honolulu

Sample#	Latitude(N)	Longitude(W)	Location	Depth
HH-01-S-1	21-19-04N	157-53-25W	50mNEofDrawBrdge NCh	11.7
HH-01-S-2	21-19-04N	157-53-25W	50mNEofDrawBrdge NCh	11.7
HH-01-S-3	21-19-04N	157-53-25W	50mNEofDrawBrdge NCh	11.7
HH-02-S-1	21-19-18N	157-53-07W	20mSofDil-HamFlDDock	10.7
HH-02-S-2	21-19-18N	157-53-07W	20mSofDil-hamFlDDock	10.7
HH-02-S-3	21-19-18N	157-53-07W	20mSofDil-hamFlDDock	10.7
HH-03-S-1	21-19-01N	157-53-08.5W	OffSEendofMatsonPier	12.2
HH-03-S-2	21-19-01N	157-53-08.5W	OffSEendofMatsonPier	12.2
HH-03-S-3	21-19-01N	157-53-08.5W	OffSEendofMatsonPier	12.2
HH-04-S-1	21-18-30N	157-52-02.5W	AdjPier#7-@HECoDChrg	7.6
HH-04-S-2	21-18-30N	157-52-02.5W	AdjPier#7-@HECoDChrg	7.6
HH-04-S-3	21-18-30N	157-52-02.5W	AdjPier#7-@HECoDChrg	7.6
HH-05-S-1	21-18-12.5N	157-52-15W	150mEHonoHbrLiteEntr	12.8
HH-05-S-2	21-18-12.5N	157-52-15W	150mEHonoHbrLiteEntr	12.8
HH-05-S-3	21-18-12.5N	157-52-15W	150mEHonoHbrLiteEntr	12.8
HH-06-S-1	21-17-14.5N	157-51-33.5W	KewaloBsn-@lngstpier	6.1
HH-06-S-2	21-17-14.5N	157-51-33.5W	KewaloBsn-@lngstpier	6.1
HH-06-S-3	21-17-14.5N	157-51-33.5W	KewaloBsn-@lngstpier	6.1
HH-07-S-1	21-17-16.5N	157-51-41W	KewaloBsn-@HTPkrsRWy	6.7
HH-07-S-2	21-17-16.5N	157-51-41W	KewaloBsn-@HTPkrsRWy	6.7
HH-07-S-3	21-17-16.5N	157-51-41W	KewaloBsn-@HTPkrsRWy	6.7
HH-08-S-1	21-17-10N	157-51-45.5W	KewaloBsn-@MidEntrCh	6.7
HH-08-S-2	21-17-10N	157-51-45.5W	KewaloBsn-@MidEntrCh	6.7
HH-08-S-3	21-17-10N	157-51-45.5W	KewaloBsn-@MidEntrCh	6.7

Table B-7(t). Tissue sample station data: Honolulu.

Sample#	Date	Time	Latitude	Longitude	Remarks
HH-01A-T-1	05Apr84	1045W	21-19-04.5N	157-53-26.5W	@NpierBasculeBridge
HH-01A-T-2	05Apr84	1047W	21-19-04.5N	157-53-26.5W	@NpierBasculeBridge
HH-01A-T-3	05Apr84	1049W	21-19-04.5N	157-53-26.5W	@NpierBasculeBridge
HH-01A-T-4	05Apr84	1051W	21-19-04.5N	157-53-26.5W	@NpierBasculeBridge
HH-01A-T-5	05Apr84	1053W	21-19-04.5N	157-53-26.5W	@NpierBasculeBridge

Table B-8(w). Water sample station data: Mayport.

Sample#	Date	Time	Latitude	Longitude	Remarks
MA-01-W-1	19Jun85	1227R	30-23-54N	81-21-37W	20mNWBuoy#4@EntrStJohn
MA-01-W-2	19Jun85	1228R	30-23-54N	81-21-37W	20mNWBuoy#4@EntrStJohn
MA-01-W-3	19Jun85	1229R	30-23-54N	81-21-37W	20mNWBuoy#4@EntrStJohn
MA-02-W-1	19Jun85	1241R	30-23-53N	81-21-04W	AdjBuoy#7@EntrStJohnsR
MA-03-W-1	19Jun85	1256R	30-23-46N	81-23-55W	AdjBuoy#1A@EntrMayptBa
MA-04-W-1	19Jun85	1310R	30-23-47N	81-24-22W	20mSWoT-PierEofPierC-2
MA-04-W-2	19Jun85	1311R	30-23-47N	81-24-22W	20mSWoT-PierEofPierC-2
MA-04-W-3	19Jun85	1312R	30-23-47N	81-24-22W	20mSWoT-PierEofPierC-2
MA-05-W-1	19Jun85	1336R	30-23-29N	81-24-41W	AdjPierD-2MayportBasin
MA-06-W-1	19Jun85	1351R	30-23-21N	81-24-28W	15mAsternoSAMPSONDDG10
MA-06-W-2	19Jun85	1352R	30-23-21N	81-24-28W	15mAsternoSAMPSONDDG10
MA-06-W-3	19Jun85	1353R	30-23-21N	81-24-28W	15mAsternoSAMPSONDDG10
MA-07-W-1	19Jun85	1401R	30-23-38N	81-24-36W	AtCenterofMayportBasin
MA-08-W-1	19Jun85	1433R	30-23-45N	81-24-55W	AdjTangoPierMyprtBasin
MA-08-W-2	19Jun85	1434R	30-23-45N	81-24-55W	AdjTangoPierMyprtBasin
MA-08-W-3	19Jun85	1435R	30-23-45N	81-24-55W	AdjTangoPierMyprtBasin
MA-09-W-1	19Jun85	1456R	30-23-49N	81-24-34W	BtwnC1&C2PrsMyprtBasin
MA-10-W-1	19Jun85	1517R	30-23-35N	81-24-32W	@NendSIMApierMyptBasin
MA-10-W-2	19Jun85	1518R	30-23-35N	81-24-32W	@NendSIMApierMyptBasin
MA-10-W-3	19Jun85	1519R	30-23-35N	81-24-32W	@NendSIMApierMyptBasin
MA-11-W-1	20Jun85	0957R	30-23-13N	81-27-40W	20moffAMIshpydMarRaway
MA-11-W-2	20Jun85	0958R	30-23-13N	81-27-40W	20moffAMIshpydMarRaway
MA-11-W-3	20Jun85	0959R	30-23-13N	81-27-40W	20moffAMIshpydMarRaway
MA-12-W-1	20Jun85	1011R	30-23-06N	81-26-34W	50mNWBuoy#22StJohnsRvr
MA-13-W-1	20Jun85	1030R	30-23-13N	81-26-07W	AdjUSCGpiersStJohnsRvr
MA-13-W-2	20Jun85	1031R	30-23-13N	81-26-07W	AdjUSCGpiersStJohnsRvr
MA-13-W-3	20Jun85	1032R	30-23-13N	81-26-07W	AdjUSCGpiersStJohnsRvr
MA-14-W-1	20Jun85	1058R	30-23-30N	81-25-58W	AdjMontysMarinStJohnsR
MA-14-W-2	20Jun85	1059R	30-23-30N	81-25-58W	AdjMontysMarinStJohnsR
MA-14-W-3	20Jun85	1100R	30-23-30N	81-25-58W	AdjMontysMarinStJohnsR
MA-15-W-1	20Jun85	1110R	30-23-53N	81-25-41W	AdjMayptFerryTStJohnsR
MA-16-W-1	20Jun85	1140R	30-24-07N	81-25-09W	25mSofBuoy#11-StJohnsR

Table B-8(s). Sediment sample station data: Mayport.

Sample#	Latitude(N)	Longitude(W)	Location	Depth
MA-01-S-1	30-23-54N	81-21-37W	20mNWBuoy#4@EntChStJns	14.5
MA-01-S-2	30-23-54N	81-21-37W	20mNWBuoy#4@EntChStJns	14.5
MA-01-S-3	30-23-54N	81-21-37W	20mNWBuoy#4@EntChStJns	14.5
MA-02-S-1	30-23-53N	81-21-04W	AdjBuoy#7@EntChStJohns	12.0
MA-02-S-2	30-23-53N	81-21-04W	AdjBuoy#7@EntChStJohns	12.0
MA-02-S-3	30-23-53N	81-21-04W	AdjBuoy#7@EntChStJohns	12.0
MA-03-S-1	30-23-46N	81-23-55W	AdjBuoy#1AEntChMyptBas	10.5
MA-03-S-2	30-23-46N	81-23-55W	AdjBuoy#1AEntChMyptBas	10.5
MA-03-S-3	30-23-46N	81-23-55W	AdjBuoy#1AEntChMyptBas	10.5
MA-04-S-1	30-23-47N	81-24-22W	20mSWoT-PierEofPierC-2	10.0
MA-04-S-2	30-23-47N	81-24-22W	20mSWoT-PierEofPierC-2	10.0
MA-04-S-3	30-23-47N	81-24-22W	20mSWoT-PierEofPierC-2	10.0
MA-05-S-1	30-23-29N	81-24-41W	AdjPierD-2MayportBasin	8.5
MA-05-S-2	30-23-29N	81-24-41W	AdjPierD-2MayportBasin	8.5
MA-05-S-3	30-23-29N	81-24-41W	AdjPierD-2MayportBasin	8.5
MA-06-S-1	30-23-21N	81-24-28W	15mAsternSAMPSONDDG-10	10.0
MA-06-S-2	30-23-21N	81-24-28W	15mAsternSAMPSONDDG-10	10.0
MA-06-S-3	30-23-21N	81-24-28W	15mAsternSAMPSONDDG-10	10.0
MA-07-S-1	30-23-38N	81-24-36W	Center of MayportBasin	12.5
MA-07-S-2	30-23-38N	81-24-36W	Center of MayportBasin	12.5
MA-07-S-3	30-23-38N	81-24-36W	Center of MayportBasin	12.5
MA-08-S-1	30-23-45N	81-24-55W	AdjTangoPierMyprtBasin	11.5
MA-08-S-2	30-23-45N	81-24-55W	AdjTangoPierMyprtBasin	11.5
MA-08-S-3	30-23-45N	81-24-55W	AdjTangoPierMyprtBasin	11.5
MA-09-S-1	30-23-49N	81-24-34W	BtwnC1&C2PrsMyprtBasin	11.5
MA-09-S-2	30-23-49N	81-24-34W	BtwnC1&C2PrsMyprtBasin	11.5
MA-09-S-3	30-23-49N	81-24-34W	BtwnC1&C2PrsMyprtBasin	11.5
MA-10-S-1	30-23-35N	81-24-32W	@NendSIMAPierMyptBasin	6.0
MA-10-S-2	30-23-35N	81-24-32W	@NendSIMAPierMyptBasin	6.0
MA-10-S-3	30-23-35N	81-24-32W	@NendSIMAPierMyptBasin	6.0
MA-11-S-1	30-23-13N	81-27-40W	20moffAMIShpydMarRaway	7.5
MA-11-S-2	30-23-13N	81-27-40W	20moffAMIShpydMarRaway	7.5
MA-11-S-3	30-23-13N	81-27-40W	20moffAMIShpydMarRaway	7.5
MA-12-S-1	30-23-06N	81-26-34W	50mNWBuoy#22StJohnsRvr	10.5
MA-12-S-2	30-23-06N	81-26-34W	50mNWBuoy#22StJohnsRvr	10.5
MA-12-S-3	30-23-06N	81-26-34W	50mNWBuoy#22StJohnsRvr	10.5
MA-13-S-1	30-23-13N	81-26-07W	AdjUSCGPiersStJohnsRvr	6.0
MA-13-S-2	30-23-13N	81-26-07W	AdjUSCGPiersStJohnsRvr	6.0
MA-13-S-3	30-23-13N	81-26-07W	AdjUSCGPiersStJohnsRvr	6.0
MA-14-S-1	30-23-30N	81-25-58W	AdjMontysMarStJohnsRvr	2.5
MA-14-S-2	30-23-30N	81-25-58W	AdjMontysMarStJohnsRvr	2.5
MA-14-S-3	30-23-30N	81-25-58W	AdjMontysMarStJohnsRvr	2.5
MA-15-S-1	30-23-53N	81-25-41W	AdjMyptFerryTStJohnsRv	9.0
MA-15-S-2	30-23-53N	81-25-41W	AdjMyptFerryTStJohnsRv	9.0
MA-15-S-3	30-23-53N	81-25-41W	AdjMyptFerryTStJohnsRv	9.0
MA-16-S-1	30-24-07N	81-25-09W	25mSBuoy#11-StJohnsRvr	6.5
MA-16-S-2	30-24-07N	81-25-09W	25mSBuoy#11-StJohnsRvr	6.5
MA-16-S-3	30-24-07N	81-25-09W	25mSBuoy#11-StJohnsRvr	6.5

Table B-8(t). Tissue sample station data: Mayport.

Sample#	Date	Time	Latitude	Longitude	Remarks
MA-01A-T-1	20Jun85	1645R	30-23-50N	81-23-16W	SoEdgeSJettyStJohnEntr
MA-01A-T-2	20Jun85	1646R	30-23-50N	81-23-16W	SoEdgeSJettyStJohnEntr
MA-01A-T-3	20Jun85	1647R	30-23-50N	81-23-16W	SoEdgeSJettyStJohnEntr
MA-01A-T-4	20Jun85	1648R	30-23-50N	81-23-16W	SoEdgeSJettyStJohnEntr
MA-01A-T-5	20Jun85	1649R	30-23-50N	81-23-16W	SoEdgeSJettyStJohnEntr
MA-03A-T-1	20Jun85	1620R	30-23-46N	81-23-55W	NsideSJtybtwn1&1AStJns
MA-03A-T-2	20Jun85	1621R	30-23-46N	81-23-55W	NsideSJtybtwn1&1AStJns
MA-03A-T-3	20Jun85	1622R	30-23-46N	81-23-55W	NsideSJtybtwn1&1AStJns
MA-03A-T-4	20Jun85	1623R	30-23-46N	81-23-55W	NsideSJtybtwn1&1AStJns
MA-03A-T-5	20Jun85	1624R	30-23-46N	81-23-55W	NsideSJtybtwn1&1AStJns
MA-04-T-1	19Jun85	1312R	30-23-48N	81-24-20W	20mSWoT-PierMayportBsn
MA-04-T-2	19Jun85	1313R	30-23-48N	81-24-20W	20mSWoT-PierMayportBsn
MA-04-T-3	19Jun85	1314R	30-23-48N	81-24-20W	20mSWoT-PierMayportBsn
MA-04-T-4	19Jun85	1315R	30-23-48N	81-24-20W	20mSWoT-PierMayportBsn
MA-04-T-5	19Jun85	1316R	30-23-48N	81-24-20W	20mSWoT-PierMayportBsn
MA-10-T-1	19Jun85	1545R	30-23-32N	81-24-30W	NendSIMAPierMayportBsn
MA-10-T-2	19Jun85	1546R	30-23-32N	81-24-30W	NendSIMAPierMayportBsn
MA-10-T-3	19Jun85	1547R	30-23-32N	81-24-30W	NendSIMAPierMayportBsn
MA-10-T-4	19Jun85	1548R	30-23-32N	81-24-30W	NendSIMAPierMayportBsn
MA-10-T-5	19Jun85	1549R	30-23-32N	81-24-30W	NendSIMAPierMayportBsn
MA-13-T-1	20Jun85	1047R	30-23-13N	81-26-07W	ConcretePierUSCGStaStJ
MA-13-T-2	20Jun85	1048R	30-23-13N	81-26-07W	ConcretePierUSCGStaStJ
MA-13-T-3	20Jun85	1049R	30-23-13N	81-26-07W	ConcretePierUSCGStaStJ
MA-13-T-4	20Jun85	1050R	30-23-13N	81-26-07W	ConcretePierUSCGStaStJ
MA-13-T-5	20Jun85	1051R	30-23-13N	81-26-07W	ConcretePierUSCGStaStJ
MA-15-T-1	20Jun85	1120R	30-23-53N	81-25-41W	@MayportFerrySlp-NPier
MA-15-T-2	20Jun85	1121R	30-23-53N	81-25-41W	@MayportFerrySlp-NPier
MA-15-T-3	20Jun85	1122R	30-23-53N	81-25-41W	@MayportFerrySlp-NPier
MA-15-T-4	20Jun85	1123R	30-23-53N	81-25-41W	@MayportFerrySlp-NPier
MA-15-T-5	20Jun85	1124R	30-23-53N	81-25-41W	@MayportFerrySlp-NPier
MA-10M-T-1	19Jun85	1552R	30-23-32N	81-24-30W	@NendSIMApierMyptBasin
MA-10M-T-2	19Jun85	1553R	30-23-32N	81-24-30W	@NendSIMApierMyptBasin
MA-10M-T-3	19Jun85	1554R	30-23-32N	81-24-30W	@NendSIMApierMyptBasin
MA-10M-T-4	19Jun85	1555R	30-23-32N	81-24-30W	@NendSIMApierMyptBasin
MA-10M-T-5	19Jun85	1556R	30-23-32N	81-24-30W	@NendSIMApierMyptBasin

Table B-9(w). Water sample station data: Charleston.

Sample#	Date	Time	Latitude	Longitude	Remarks
CS-01-W-1	15NOV84	0850R	32-43-30N	79-50-40W	EntrSjettyadjbuoy#15
CS-01-W-2	15NOV84	0851R	32-43-30N	79-50-40W	EntrSjettyadjbuoy#15
CS-01-W-3	15NOV84	0852R	32-43-30N	79-50-40W	EntrSjettyadjbuoy#15
CS-01A-W-1	15NOV84	0938R	32-43-00N	79-51-00W	Entr jetty @ Buoy#19
CS-02-W-1	15NOV84	1000R	32-44-55N	79-51-50W	adjFt.Sumter150mN#23
CS-03-W-1	15NOV84	1016R	32-46-40N	79-48-35W	Marina@brdgeSulIsNrw
CS-04-W-1	15NOV84	1102R	32-46-23N	79-50-50W	Toddlers Cove Marina
CS-05-W-1	15NOV84	1112R	32-46-07N	79-52-15W	EntrSullivansIs@mkrC
CS-06-W-1	15NOV84	1152R	32-46-42N	79-57-10W	CharlestonMuniMarina
CS-06-W-2	15NOV84	1153R	32-46-42N	79-57-10W	CharlestonMuniMarina
CS-06-W-3	15NOV84	1154R	32-46-42N	79-57-10W	CharlestonMuniMarina
CS-07-W-1	15NOV84	1213R	32-46-22N	79-56-39W	CoastGuardStaPierAsh
CS-08-W-1	15NOV84	1229R	32-46-05N	79-56-09W	AdjBuoy#2offCBattery
CS-09-W-1	15NOV84	1235R	32-46-24N	79-55-09W	50mSofMuniPieroffBat
CS-10-W-1	15NOV84	1240R	32-46-50N	79-55-23W	MuniDock(offCustomHs
CS-11-W-1	15NOV84	1247R	32-47-20N	79-55-27W	OffNTugPier-MuniPier
CS-12-W-1	15NOV84	1252R	32-47-33N	79-55-31W	AdjTownCreekBoatYard
CS-13-W-1	15NOV84	1305R	32-49-07N	79-55-43W	NendDrumIs@unmkdMrkr
CS-14-W-1	15NOV84	1310R	32-49-42N	79-55-58W	@EntrtoShipyardCreek
CS-15-W-1	15NOV84	1316R	32-50-29N	79-55-55W	ChstnNavSta@BOQMarna
CS-16-W-1	15NOV84	1356R	32-54-25N	79-56-05W	EntrYellowHouseCreek
CS-16-W-2	15NOV84	1357R	32-54-25N	79-56-05W	EntrYellowHouseCreek
CS-16-W-3	15NOV84	1358R	32-54-25N	79-56-05W	EntrYellowHouseCreek
CS-17-W-1	15NOV84	1416R	32-54-58N	79-55-39W	OffSternAFDM2:mid-ch
CS-17-W-2	15NOV84	1417R	32-54-58N	79-55-39W	OffSternAFDM2:mid-ch
CS-17-W-3	15NOV84	1418R	32-54-58N	79-55-39W	OffSternAFDM2:mid-ch
CS-18-W-1	15NOV84	1432R	32-54-43N	79-57-10W	GooseCrk25moffBoatHs
CS-19-W-1	15NOV84	1445R	32-53-52N	79-57-47W	SendPrtTerm@PulpMill
CS-20-W-1	15NOV84	1455R	32-51-53N	79-57-44W	20moffendDPierChNSYd
CS-20-W-2	15NOV84	1456R	32-51-53N	79-57-44W	20moffendDPierChNSYd
CS-20-W-3	15NOV84	1457R	32-51-53N	79-57-44W	20moffendDPierChNSYd
CS-21-W-1	15NOV84	1501R	32-51-47N	79-57-55W	ChstnNSYD-btwnDryDks
CS-21-W-2	15NOV84	1502R	32-51-47N	79-57-55W	ChstnNSYD-btwnDryDks
CS-21-W-3	15NOV84	1503R	32-51-47N	79-57-55W	ChstnNSYD-btwnDryDks
CS-22-W-1	15NOV84	1512R	32-51-32N	79-57-24W	20mfmEendHPier@AFDM3
CS-22-W-2	15NOV84	1513R	32-51-32N	79-57-24W	20mfmEendHPier@AFDM3
CS-22-W-3	15NOV84	1514R	32-51-32N	79-57-24W	20mfmEendHPier@AFDM3
CS-23-W-1	15NOV84	1523R	32-51-10N	79-56-38W	20mfmEendPPierNavSta
CS-24-W-1	15NOV84	1533R	32-51-25N	79-56-09W	OffmouthClouterCreek
CS-24-W-2	15NOV84	1534R	32-51-25N	79-56-09W	OffmouthClouterCreek
CS-24-W-3	15NOV84	1535R	32-51-25N	79-56-09W	OffmouthClouterCreek
CS-25-W-1	15NOV84	1546R	32-50-55N	79-56-08W	SofUPier-outbdMS0490
CS-25-W-2	15NOV84	1547R	32-50-55N	79-56-08W	SofUPier-outbdMS0490
CS-25-W-3	15NOV84	1548R	32-50-55N	79-56-08W	SofUPier-outbdMS0490

Table B-9(s). Sediment sample station data: Charleston.

Sample#	Latitude(N)	Longitude(W)	Location	Depth
CS1-01-S-1	32-43-30N	79-50-40W	EntrSjettyadjbuoy#15	7.6
CS1-01-S-2	32-43-30N	79-50-40W	EntrSjettyadjbuoy#15	7.6
CS1-01-S-3	32-43-30N	79-50-40W	EntrSjettyadjbuoy#15	7.6
CS1-01A-S-1	32-43-00N	79-51-00W	Entr jetty @ buoy#19	13.7
CS1-01A-S-2	32-43-00N	79-51-00W	Entr jetty @ buoy#19	13.7
CS1-01A-S-3	32-43-00N	79-51-00W	Entr jetty @ buoy#19	13.7
CS1-02-S-1	32-44-55N	79-51-50W	adjFt.Sumter150mN#23	7.0
CS1-02-S-2	32-44-55N	79-51-50W	adjFt.Sumter150mN#23	7.0
CS1-02-S-3	32-44-55N	79-51-50W	adjFt.Sumter150mN#23	7.0
CS1-03-S-1	32-46-40N	79-48-35W	Marina@brdgeSulIsNrw	3.4
CS1-03-S-2	32-46-40N	79-48-35W	Marina@brdgeSulIsNrw	3.4
CS1-03-S-3	32-46-40N	79-48-35W	Marina@brdgeSulIsNrw	3.4
CS1-04-S-1	32-46-23N	79-50-50W	Toddlers Cove Marina	3.4
CS1-04-S-2	32-46-23N	79-50-50W	Toddlers Cove Marina	3.4
CS1-04-S-3	32-46-23N	79-50-50W	Toddlers Cove Marina	3.4
CS1-05-S-1	32-46-07N	79-52-15W	EntrSullivansIs@mkrC	3.0
CS1-05-S-2	32-46-07N	79-52-15W	EntrSullivansIs@mkrC	3.0
CS1-05-S-3	32-46-07N	79-52-15W	EntrSullivansIs@mkrC	3.0
CS1-06-S-1	32-46-42N	79-57-10W	CharlestonMuniMarina	4.5
CS1-06-S-2	32-46-42N	79-57-10W	CharlestonMuniMarina	4.5
CS1-06-S-3	32-46-42N	79-57-10W	CharlestonMuniMarina	4.5
CS1-07-S-1	32-46-22N	79-56-39W	CoastGuardStaPierAsh	6.0
CS1-07-S-2	32-46-22N	79-56-39W	CoastGuardStaPierAsh	6.0
CS1-07-S-3	32-46-22N	79-56-39W	CoastGuardStaPierAsh	6.0
CS1-08-S-1	32-46-05N	79-56-09W	AdjBuoy#2offCBattery	4.0
CS1-08-S-2	32-46-05N	79-56-09W	AdjBuoy#2offCBattery	4.0
CS1-08-S-3	32-46-05N	79-56-09W	AdjBuoy#2offCBattery	4.0
CS1-09-S-1	32-46-24N	79-55-29W	50mSofMuniPieroffBat	6.0
CS1-09-S-2	32-46-24N	79-55-29W	50mSofMuniPieroffBat	6.0
CS1-09-S-3	32-46-24N	79-55-29W	50mSofMuniPieroffBat	6.0
CS1-10-S-1	32-46-50N	79-55-23W	MuniDock:offCustomHs	16.0
CS1-10-S-2	32-46-50N	79-55-23W	MuniDock:offCustomHs	16.0
CS1-10-S-3	32-46-50N	79-55-23W	MuniDock:offCustomHs	16.0
CS1-11-S-1	32-47-20N	79-55-27W	OffNTugPier-MuniPier	9.5
CS1-11-S-2	32-47-20N	79-55-27W	OffNTugPier-MuniPier	9.5
CS1-11-S-3	32-47-20N	79-55-27W	OffNTugPier-MuniPier	9.5
CS1-12-S-1	32-47-33N	79-55-31W	AdjTownCreekBoatYard	8.0
CS1-12-S-2	32-47-33N	79-55-31W	AdjTownCreekBoatYard	8.0
CS1-12-S-3	32-47-33N	79-55-31W	AdjTownCreekBoatYard	8.0
CS1-13-S-1	32-49-07N	79-55-43W	NendDrumIs@unmkdMrkr	4.5
CS1-13-S-2	32-49-07N	79-55-43W	NendDrumIs@unmkdMrkr	4.5
CS1-13-S-3	32-49-07N	79-55-43W	NendDrumIs@unmkdMrkr	4.5
CS1-14-S-1	32-49-42N	79-55-58W	@EntrtoShipyardCreek	9.0
CS1-14-S-2	32-49-42N	79-55-58W	@EntrtoShipyardCreek	9.0
CS1-14-S-3	32-49-42N	79-55-58W	@EntrtoShipyardCreek	9.0
CS1-15-S-1	32-50-29N	79-55-55W	ChstnNavSta@BOQMarna	5.0
CS1-15-S-2	32-50-29N	79-55-55W	ChstnNavSta@BOQMarna	5.0
CS1-15-S-3	32-50-29N	79-55-55W	ChstnNavSta@BOQMarna	5.0
CS1-16-S-1	32-54-25N	79-56-05W	EntrYellowHouseCreek	6.0
CS1-16-S-2	32-54-25N	79-56-05W	EntrYellowHouseCreek	6.0

Table B-9(s). Sediment sample station data: Charleston (continued).

Sample#	Latitude(N)	Longitude(W)	Location	Depth
CS1-16-S-3	32-54-25N	79-56-05W	EntrYellowHouseCreek	6.0
CS1-17-S-1	32-54-58N	79-55-39W	@ARDM-2:mid-chCooper	18.0
CS1-17-S-2	32-54-58N	79-55-39W	@ARDM-2:mid-chCooper	18.0
CS1-17-S-3	32-54-58N	79-55-39W	@ARDM-2:mid-chCooper	18.0
CS1-18-S-1	32-54-43N	79-57-10W	GooseCrk25moffBoatHs	6.0
CS1-18-S-2	32-54-43N	79-57-10W	GooseCrk25moffBoatHs	6.0
CS1-18-S-3	32-54-43N	79-57-10W	GooseCrk25moffBoatHs	6.0
CS1-19-S-1	32-53-52N	79-57-47W	SendPrtTerm@PulpMill	16.0
CS1-19-S-2	32-53-52N	79-57-47W	SendPrtTerm@PulpMill	16.0
CS1-19-S-3	32-53-52N	79-57-47W	SendPrtTerm@PulpMill	16.0
CS1-20-S-1	32-51-53N	79-57-44W	20moffendDPierChNSYd	14.0
CS1-20-S-2	32-51-53N	79-57-44W	20moffendDPierChNSYd	14.0
CS1-20-S-3	32-51-53N	79-57-44W	20moffendDPierChNSYd	14.0
CS1-21-S-1	32-51-47N	79-57-55W	ChstnNSYD-btwnDryDks	12.0
CS1-21-S-2	32-51-47N	79-57-55W	ChstnNSYD-btwnDryDks	12.0
CS1-21-S-3	32-51-47N	79-57-55W	ChstnNSYD-btwnDryDks	12.0
CS1-22-S-1	32-51-32N	79-57-24W	20mfmEendHPier@AFDM3	17.0
CS1-22-S-2	32-51-32N	79-57-24W	20mfmEendHPier@AFDM3	17.0
CS1-22-S-3	32-51-32N	79-57-24W	20mfmEendHPier@AFDM3	17.0
CS1-23-S-1	32-51-10N	79-56-38W	20mfmEendHPier@AFDM3	19.0
CS1-23-S-2	32-51-10N	79-56-38W	20mfmEendHPier@AFDM3	19.0
CS1-23-S-3	32-51-10N	79-56-38W	20mfmEendHPier@AFDM3	19.0
CS1-24-S-1	32-51-25N	79-56-09W	OffMouthClouterCreek	3.5
CS1-24-S-2	32-51-25N	79-56-09W	OffMouthClouterCreek	3.5
CS1-24-S-3	32-51-25N	79-56-09W	OffMouthClouterCreek	3.5
CS1-25-S-1	32-50-55N	79-56-08W	20mSofPierUChnNavSta	12.0
CS1-25-S-2	32-50-55N	79-56-08W	20mSofPierUChnNavSta	12.0
CS1-25-S-3	32-50-55N	79-56-08W	20mSofPierUChnNavSta	12.0

Table B-9(t). Tissue sample station data: Charleston.

Sample#	Date	Time	Latitude	Longitude	Remarks
CS1-01-T-1	15NOV85	0855R	32-43-30N	79-50-40W	EntrSjettyadjbuoy#15
CS1-01-T-2	15NOV85	0856R	32-43-30N	79-50-40W	EntrSjettyadjbuoy#15
CS1-01-T-3	15NOV85	0857R	32-43-30N	79-50-40W	EntrSjettyadjbuoy#15
CS1-01-T-4	15NOV85	0858R	32-43-30N	79-50-40W	EntrSjettyadjbuoy#15
CS1-01-T-5	15NOV85	0900R	32-43-30N	79-50-40W	EntrSjettyadjbuoy#15
CS1-03-T-1	15NOV85	1020R	32-46-40N	79-48-35W	Marina@brdgeSulIsNrw
CS1-03-T-2	15NOV85	1021R	32-46-40N	79-48-35W	Marina@brdgeSulIsNrw
CS1-03-T-3	15NOV85	1022R	32-46-40N	79-48-35W	Marina@brdgeSulIsNrw
CS1-03-T-4	15NOV85	1023R	32-46-40N	79-48-35W	Marina@brdgeSulIsNrw
CS1-03-T-5	15NOV85	1024R	32-46-40N	79-48-35W	Marina@brdgeSulIsNrw
CS1-06-T-1	15NOV85	1156R	32-46-42N	79-57-10W	CharlestonMuniMarina
CS1-06-T-2	15NOV85	1157R	32-46-42N	79-57-10W	CharlestonMuniMarina
CS1-06-T-3	15NOV85	1158R	32-46-42N	79-57-10W	CharlestonMuniMarina
CS1-06-T-4	15NOV85	1159R	32-46-42N	79-57-10W	CharlestonMuniMarina
CS1-06-T-5	15NOV85	1200R	32-46-42N	79-57-10W	CharlestonMuniMarina
CS1-07-T-1	15NOV85	1215R	32-46-22N	79-56-39W	CharlestonMuniMarina
CS1-07-T-2	15NOV85	1216R	32-46-22N	79-56-39W	CharlestonMuniMarina
CS1-07-T-3	15NOV85	1217R	32-46-22N	79-56-39W	CharlestonMuniMarina
CS1-07-T-4	15NOV85	1218R	32-46-22N	79-56-39W	CharlestonMuniMarina
CS1-07-T-5	15NOV85	1219R	32-46-22N	79-56-39W	CharlestonMuniMarina
CS1-10-T-1	15NOV85	1242R	32-46-50N	79-55-23W	MuniDock:offCustomHs
CS1-10-T-2	15NOV85	1243R	32-46-50N	79-55-23W	MuniDock:offCustomHs
CS1-10-T-3	15NOV85	1244R	32-46-50N	79-55-23W	MuniDock:offCustomHs
CS1-10-T-4	15NOV85	1245R	32-46-50N	79-55-23W	MuniDock:offCustomHs
CS1-10-T-5	15NOV85	1246R	32-46-50N	79-55-23W	MuniDock:offCustomHs
CS1-12-T-1	15NOV85	1256R	32-47-33N	79-55-31W	TownCreekBoatYd@Pier
CS1-12-T-2	15NOV85	1257R	32-47-33N	79-55-31W	TownCreekBoatYd@Pier
CS1-12-T-3	15NOV85	1258R	32-47-33N	79-55-31W	TownCreekBoatYd@Pier
CS1-12-T-4	15NOV85	1259R	32-47-33N	79-55-31W	TownCreekBoatYd@Pier
CS1-12-T-5	15NOV85	1300R	32-47-33N	79-55-31W	TownCreekBoatYd@Pier
CS1-21-T-1	15NOV85	1400R	32-51-47N	79-57-55W	ChstnNSYD-btwnDryDks
CS1-21-T-2	15NOV85	1401R	32-51-47N	79-57-55W	ChstnNSYD-btwnDryDks
CS1-21-T-3	15NOV85	1402R	32-51-47N	79-57-55W	ChstnNSYD-btwnDryDks
CS1-21-T-4	15NOV85	1403R	32-51-47N	79-57-55W	ChstnNSYD-btwnDryDks
CS1-21-T-5	15NOV85	1404R	32-51-47N	79-57-55W	ChstnNSYD-btwnDryDks
CS1-25-T-1	15NOV85	1425R	32-50-55N	79-56-08W	@"U"Pier:ChstnNavSta
CS1-25-T-2	15NOV85	1426R	32-50-55N	79-56-08W	@"U"Pier:ChstnNavSta
CS1-25-T-3	15NOV85	1427R	32-50-55N	79-56-08W	@"U"Pier:ChstnNavSta
CS1-25-T-4	15NOV85	1428R	32-50-55N	79-56-08W	@"U"Pier:ChstnNavSta
CS1-25-T-5	15NOV85	1429R	32-50-55N	79-56-08W	@"U"Pier:ChstnNavSta

Table B-10(w). Water sample station data: Norfolk.

Sample#	Date	Time	Latitude	Longitude	Remarks
NF1-01-W-1	24May84	0802R	36-59-32N	76-18-03W	ENTR-250mNEofBuoy#1
NF1-01-W-2	24May84	0804R	36-59-32N	76-18-03W	ENTR-250mNEofBuoy#1
NF1-01-W-3	24May84	0806R	36-59-32N	76-18-03W	ENTR-250mNEofBuoy#1
NF1-02-W-1	24May84	0828R	36-58-22N	76-19-50W	AdjBuoy#3NWSewellsPt
NF1-03-W-1	24May84	0838R	36-57-45N	76-19-52W	AdjPier#12-30mSSide
NF1-04-W-1	24May84	0902R	36-56-57N	76-20-03W	NSC/NOB Rnge@Pier#4
NF1-05-W-1	24May84	0916R	36-56-48N	76-20-35W	150mWofNorfkHbrReach
NF1-06-W-1	24May84	0933R	36-56-48N	76-21-32W	midwybtwnH&IBuoysRng
NF1-07-W-1	24May84	0945R	36-56-06N	76-23-03W	AdjSTankeroffCraneyI
NF1-08-W-1	24May84	1012R	36-56-21N	76-19-50W	AdjAFDM#10@D&SPiers
NF1-10-W-1	24May84	1042R	36-52-08N	76-19-42W	LambertBend@Buoy#29
NF1-11-W-1	24May84	1058R	36-50-47N	76-18-01W	TownPoint adjBuoy#36
NF1-12-W-1	24May84	1116R	36-50-12N	76-14-45W	EBrElizabethR@4thBrg
NF1-13-W-1	24May84	1125R	36-50-26N	76-14-04W	@commercialfltgDryDk
NF1-14-W-1	24May84	1137R	36-49-47N	76-17-35W	adjNORSHIPCO-2ndPier
NF1-15-W-1	24May84	1245R	36-46-33N	76-17-43W	SBrElizabethR@4thBrg
NF1-16-W-1	24May84	1306R	36-47-29N	76-18-10W	SBrElizabethR@Buell
NF1-17-W-1	24May84	1320R	36-47-57N	76-17-36W	SBrElizabethR@ParaCk
NF1-18-W-1	24May84	1335R	36-48-44N	76-17-49W	15mEofDDk#8(NNSY)Rng
NF1-19-W-1	24May84	1554R	36-48-48N	76-17-43W	30mSEofSlip#3(NNSY)
NF1-19-W-2	24May84	1555R	36-48-48N	76-17-43W	30mSEofSlip#3(NNSY)
NF1-20-W-1	24May84	1605R	36-48-52.5N	76-17-36W	100mSEofSlip#3(NNSY)
NF1-21-W-1	24May84	1610R	36-49-17.5N	76-17-30W	InsideofSlip#2(NNSY)
NF1-22-W-1	25May84	0745R	36-57-13N	76-18-41W	NASMarina/WillobyBay
NF1-23-W-1	25May84	0815R	36-57-42N	76-24-40W	NewportNewsPoint/Bar
NF1-24-W-1	25May84	0840R	37-00-05N	76-27-20W	NewportNewsSlipwy#12
NF1-25-W-1	25May84	0848R	36-59-50N	76-28-30W	JamesRiverBrdgCntrPr
NF1-25-W-2	25May84	0849R	36-59-50N	76-28-30W	JamesRiverBrdgCntrPr
NF1-25-W-3	25May84	0850R	36-59-50N	76-28-30W	JamesRiverBrdgCntrPr
NF1-26-W-1	25May84	0907R	36-58-46N	76-59-46W	JamesRBrdg@NasewaySh
NF1-27-W-1	25May84	1047R	36-58-42.5N	76-26-30W	NewportNews@CVApiers
NF1-28-W-1	25May84	10458	36-57-35N	76-25-07W	NewportNews@midpier
NF1-29-W-1	25May84	1116R	36-56-40N	76-23-27W	15mERedLtHseHamptonR
NF1-29-W-2	25May84	1118R	36-56-40N	76-23-27W	15mERedLtHseHamptonR
NF1-29-W-3	25May84	1120R	36-56-40N	76-23-27W	15mERedLtHseHamptonR
NF1-30-W-1	25May84	1142R	36-56-28N	76-20-08W	D&SPiers-adjSpruance
NF1-30-W-2	25May84	1143R	36-56-28N	76-20-08W	D&SPiers-adjSpruance
NF1-30-W-3	25May84	1144R	36-56-28N	76-20-08W	D&SPiers-adjSpruance
NF1-31-W-1	25May84	1223R	36-50-26N	76-17-50W	PortsmthYachtHbrCntr
NF1-32-W-1	25May84	1236R	36-49-56.5N	76-17-46W	So.EndPortsmouthQuay

Table B-10(s). Sediment sample station data: Norfolk.

Sample#	Latitude(N)	Longitude(W)	Location	Depth
NF1-01-S-1	36-59-32N	76-18-03W	EntrCh250mNEofBuoy#1	25.0
NF1-01-S-2	36-59-32N	76-18-03W	EntrCh250mNEofBuoy#1	25.0
NF1-01-S-3	36-59-32N	76-18-03W	EntrCh250mNEofBuoy#1	25.0
NF1-02-S-1	36-58-22N	76-19-50W	NofSewellsPt @Buoy#3	25.0
NF1-02-S-2	36-58-22N	76-19-50W	NofSewellsPt @Buoy#3	25.0
NF1-02-S-3	36-58-22N	76-19-50W	NofSewellsPt @Buoy#3	25.0
NF1-03-S-1	36-57-45N	76-19-52W	SewellsPtSsidePier12	45.0
NF1-03-S-2	36-57-45N	76-19-52W	SewellsPtSsidePier12	45.0
NF1-03-S-3	36-57-45N	76-19-52W	SewellsPtSsidePier12	45.0
NF1-04-S-1	36-56-57N	76-20-03W	NSC/NOB Rnge @Pier#4	37.0
NF1-04-S-2	36-56-57N	76-20-03W	NSC/NOB Rnge @Pier#4	37.0
NF1-04-S-3	36-56-57N	76-20-03W	NSC/NOB Rnge @Pier#4	37.0
NF1-05-S-1	36-56-48N	76-20-35W	150mWofNorfkHbrReach	20.0
NF1-05-S-2	36-56-48N	76-20-35W	150mWofNorfkHbrReach	20.0
NF1-05-S-3	36-56-48N	76-20-35W	150mWofNorfkHbrReach	20.0
NF1-06-S-1	36-56-42N	76-21-32W	MidwybtwnH&IBuoysRng	24.0
NF1-06-S-2	36-56-42N	76-21-32W	MidwybtwnH&IBuoysRng	24.0
NF1-06-S-3	36-56-42N	76-21-32W	MidwybtwnH&IBuoysRng	24.0
NF1-07-S-1	36-56-06N	76-23-03W	AdjSWTankeroffCraney	27.0
NF1-07-S-2	36-56-06N	76-23-03W	AdjSWTankeroffCraney	27.0
NF1-07-S-3	36-56-06N	76-23-03W	AdjSWTankeroffCraney	27.0
NF1-08-S-1	36-56-21N	76-19-50W	AdjAFDM#10 @D&SPiers	35.0
NF1-08-S-2	36-56-21N	76-19-50W	AdjAFDM#10 @D&SPiers	35.0
NF1-08-S-3	36-56-21N	76-19-50W	AdjAFDM#10 @D&SPiers	35.0
NF1-09-S-1	36-55-02N	76-20-32W	AdjBuoy#14-offCraney	30.0
NF1-09-S-2	36-55-02N	76-20-32W	AdjBuoy#14-offCraney	30.0
NF1-09-S-3	36-55-02N	76-20-32W	AdjBuoy#14-offCraney	30.0
NF1-10-S-1	36-52-08N	76-19-42W	LambertBend @Buoy#29	20.0
NF1-10-S-2	36-52-08N	76-19-42W	LambertBend @Buoy#29	20.0
NF1-10-S-3	36-52-08N	76-19-42W	LambertBend @Buoy#29	20.0
NF1-11-S-1	36-50-47N	76-18-01W	TownPoint adjBuoy#36	20.0
NF1-11-S-2	36-50-47N	76-18-01W	TownPoint adjBuoy#36	20.0
NF1-11-S-3	36-50-47N	76-18-01W	TownPoint adjBuoy#36	20.0
NF1-12-S-1	36-50-12N	76-14-45W	EBrElizabethR@4thBdg	20.0
NF1-12-S-2	36-50-12N	76-14-45W	EBrElizabethR@4thBdg	20.0
NF1-12-S-3	36-50-12N	76-14-45W	EBrElizabethR@4thBdg	20.0
NF1-13-S-1	36-50-26N	76-16-04W	@commercialfltgDrydk	25.0
NF1-13-S-2	36-50-26N	76-16-04W	@commercialfltgDrydk	25.0
NF1-13-S-3	36-50-26N	76-16-04W	@commercialfltgDrydk	25.0
NF1-14-S-1	36-49-47N	76-17-35W	adjNORSHIPCO-2ndPier	32.0
NF1-14-S-2	36-49-47N	76-17-35W	adjNORSHIPCO-2ndPier	32.0
NF1-14-S-3	36-49-47N	76-17-35W	adjNORSHIPCO-2ndPier	32.0
NF1-15-S-1	36-49-33N	76-17-43W	SBrElizabethR@4thBrg	42.0
NF1-15-S-2	36-49-33N	76-17-43W	SBrElizabethR@4thBrg	42.0
NF1-15-S-3	36-49-33N	76-17-43W	SBrElizabethR@4thBrg	42.0
NF1-16-S-1	36-47-29N	76-18-10W	SBrElizabethR @Buell	20.0
NF1-16-S-2	36-47-29N	76-18-10W	SBrElizabethR @Buell	20.0
NF1-16-S-3	36-47-29N	76-18-10W	SBrElizabethR @Buell	20.0
NF1-17-S-1	36-47-57N	76-17-36W	SBrElizabethR@ParaCk	37.0
NF1-17-S-2	36-47-57N	76-17-36W	SBrElizabethR@ParaCk	37.0

Table B-10(s). Sediment sample station data: Norfolk (continued).

Sample#	Latitude(N)	Longitude(W)	Location	Depth
NF1-17-S-3	36-47-57N	76-17-36W	SBrElizabethR@ParaCk	37.0
NF1-18-S-1	36-48-44N	76-17-49W	15mEofDDk#8(NNSY)Rng	38.0
NF1-18-S-2	36-48-44N	76-17-49W	15mEofDDk#8(NNSY)Rng	38.0
NF1-18-S-3	36-48-44N	76-17-49W	15mEofDDk#8(NNSY)Rng	38.0
NF1-19-S-1	36-48-48N	76-17-43W	30mSEofSlip#3 (NNSY)	40.0
NF1-19-S-2	36-48-48N	76-17-43W	30mSEofSlip#3 (NNSY)	40.0
NF1-19-S-3	36-48-48N	76-17-43W	30mSEofSlip#3 (NNSY)	40.0
NF1-20-S-1	36-48-52.5N	76-17-36W	100mSEofSlip#3(NNSY)	40.0
NF1-20-S-2	36-48-52.5N	76-17-36W	100mSEofSlip#3(NNSY)	40.0
NF1-20-S-3	36-48-52.5N	76-17-36W	100mSEofSlip#3(NNSY)	40.0
NF1-21-S-1	36-49-17.5N	76-17-30W	Inside Slip#2 (NNSY)	42.0
NF1-21-S-2	36-49-17.5N	76-17-30W	Inside Slip#2 (NNSY)	42.0
NF1-21-S-3	36-49-17.5N	76-17-30W	Inside Slip#2 (NNSY)	42.0
NF1-22-S-1	36-57-13N	76-18-41W	NASMarina/WillobyBay	10.0
NF1-22-S-2	36-57-13N	76-18-41W	NASMarina/WillobyBay	10.0
NF1-22-S-3	36-57-13N	76-18-41W	NASMarina/WillobyBay	10.0
NF1-23-S-1	36-57-42N	76-24-40W	NewportNewsPoint/Bar	30.0
NF1-23-S-2	36-57-42N	76-24-40W	NewportNewsPoint/Bar	30.0
NF1-23-S-3	36-57-42N	76-24-40W	NewportNewsPoint/Bar	30.0
NF1-24-S-1	37-00-05N	76-27-20W	NewportNewsSlipWy#12	33.0
NF1-24-S-2	37-00-05N	76-27-20W	NewportNewsSlipWy#12	33.0
NF1-24-S-3	37-00-05N	76-27-20W	NewportNewsSlipWy#12	33.0
NF1-25-S-1	36-59-50N	76-28-30W	JamesRiverBrdgCntrPr	38.0
NF1-25-S-2	36-59-50N	76-28-30W	JamesRiverBrdgCntrPr	38.0
NF1-25-S-3	36-59-50N	76-28-30W	JamesRiverBrdgCntrPr	38.0
NF1-26-S-1	36-58-46N	76-59-46W	JamesRBrdg@NasewaySh	17.0
NF1-26-S-2	36-58-46N	76-59-46W	JamesRBrdg@NasewaySh	17.0
NF1-26-S-3	36-58-46N	76-59-46W	JamesRBrdg@NasewaySh	17.0
NF1-27-S-1	36-58-42.5N	76-26-30W	NewportNews@CVApiers	34.0
NF1-27-S-2	36-58-42.5N	76-26-30W	NewportNews@CVApiers	34.0
NF1-27-S-3	36-58-42.5N	76-26-30W	NewportNews@CVApiers	34.0
NF1-28-S-1	36-57-35.5N	76-25-07W	NewportNews@mid(VPA)	33.0
NF1-28-S-2	36-57-35.5N	76-25-07W	NewportNews@mid(VPA)	33.0
NF1-28-S-3	36-57-35.5N	76-25-07W	NewportNews@mid(VPA)	33.0
NF1-29-S-1	36-56-40N	76-23-27W	15mERedLtHseHamptonR	20.0
NF1-29-S-2	36-56-40N	76-23-27W	15mERedLtHseHamptonR	20.0
NF1-29-S-3	36-56-40N	76-23-27W	15mERedLtHseHamptonR	20.0
NF1-30a-S-1	36-55-51N	76-20-03W	1stCivPierSofD&SPers	32.0
NF1-30a-S-2	36-55-51N	76-20-03W	1stCivPierSofD&SPers	32.0
NF1-30a-S-3	36-55-51N	76-20-03W	1stCivPierSofD&SPers	32.0
NF1-31-S-1	36-50-26N	76-17-50W	CtrPortsmuthYachtHbr	7.0
NF1-31-S-2	36-50-26N	76-17-50W	CtrPortsmuthYachtHbr	7.0
NF1-31-S-3	36-50-26N	76-17-50W	CtrPortsmuthYachtHbr	7.0
NF1-32-S-1	36-49-56.5N	76-17-46W	So.endPortsmouthquay	21.0
NF1-32-S-2	36-49-56.5N	76-17-46W	So.endPortsmouthquay	21.0
NF1-32-S-3	36-49-56.5N	76-17-46W	So.endPortsmouthquay	21.0

Table B-10(t). Tissue sample station data: Norfolk.

Sample#	Date	Time	Latitude	Longitude	Remarks
NF1-13A-T-1	24May84	1130R	36-50-22N	76-16-30W	EBrElizabethR2ndBrdg
NF1-13A-T-2	24May84	1131R	36-50-22N	76-16-30W	EBrElizabethR2ndBrdg
NF1-13A-T-3	24May84	1132R	36-50-22N	76-16-30W	EBrElizabethR2ndBrdg
NF1-13A-T-4	24May84	1133R	36-50-22N	76-16-30W	EBrElizabethR2ndBrdg
NF1-13A-T-5	24May84	1134R	36-50-22N	76-16-30W	EBrElizabethR2ndBrdg
NF1-15-T-1	24May84	1250R	36-46-33N	76-17-43W	SBrElizabethR4thBrdg
NF1-15-T-2	24May84	1251R	36-46-33N	76-17-43W	SBrElizabethR4thBrdg
NF1-15-T-3	24May84	1252R	36-46-33N	76-17-43W	SBrElizabethR4thBrdg
NF1-15-T-4	24May84	1253R	36-46-33N	76-17-43W	SBrElizabethR4thBrdg
NF1-15-T-5	24May84	1254R	36-46-33N	76-17-43W	SBrElizabethR4thBrdg
NF1-17A-T-1	24May84	1338R	36-47-50N	76-17-38W	SBrElizabethR3rdBrdg
NF1-17A-T-2	24May84	1339R	36-47-50N	76-17-38W	SBrElizabethR3rdBrdg
NF1-17A-T-3	24May84	1340R	36-47-50N	76-17-38W	SBrElizabethR3rdBrdg
NF1-17A-T-4	24May84	1341R	36-47-50N	76-17-38W	SBrElizabethR3rdBrdg
NF1-17A-T-5	24May84	1342R	36-47-50N	76-17-38W	SBrElizabethR3rdBrdg
NF1-23-T-1	25May84	0822R	36-47-42N	76-24-20W	OffNewportNewsPoint
NF1-23-T-2	25May84	0823R	36-47-42N	76-24-20W	OffNewportNewsPoint
NF1-23-T-3	25May84	0824R	36-47-42N	76-24-20W	OffNewportNewsPoint
NF1-23-T-4	25May84	0825R	36-47-42N	76-24-20W	OffNewportNewsPoint
NF1-23-T-5	25May84	0826R	36-47-42N	76-24-20W	OffNewportNewsPoint
NF1-25-T-1	25May84	0900R	36-59-50N	76-28-30W	JamesRiverBridgeCntr
NF1-25-T-2	25May84	0901R	36-59-50N	76-28-30W	JamesRiverBridgeCntr
NF1-25-T-3	25May84	0902R	36-59-50N	76-28-30W	JamesRiverBridgeCntr
NF1-25-T-4	25May84	0903R	36-59-50N	76-28-30W	JamesRiverBridgeCntr
NF1-25-T-5	25May84	0904R	36-59-50N	76-28-30W	JamesRiverBridgeCntr
NF1-28-T-1	25May84	1103R	36-57-35N	76-25-07W	OffNewportNewsMiddle
NF1-28-T-2	25May84	1104R	36-57-35N	76-25-07W	OffNewportNewsMiddle
NF1-28-T-3	25May84	1105R	36-57-35N	76-25-07W	OffNewportNewsMiddle
NF1-28-T-4	25May84	1106R	36-57-35N	76-25-07W	OffNewportNewsMiddle
NF1-28-T-5	25May84	1107R	36-57-35N	76-25-07W	OffNewportNewsMiddle
NF1-29-T-1	25May84	1130R	36-56-40N	76-23-27W	NwprtNewsShlsLiteHse
NF1-29-T-2	25May84	1131R	36-56-40N	76-23-27W	NwprtNewsShlsLiteHse
NF1-29-T-3	25May84	1132R	36-56-40N	76-23-27W	NwprtNewsShlsLiteHse
NF1-29-T-4	25May84	1133R	36-56-40N	76-23-27W	NwprtNewsShlsLiteHse
NF1-29-T-5	25May84	1134R	36-56-40N	76-23-27W	NwprtNewsShlsLiteHse
NF1-32-T-1	25May84	1230R	36-56-40N	76-23-27W	So.EndPortsmouthQuay
NF1-32-T-2	25May84	1231R	36-56-40N	76-23-27W	So.EndPortsmouthQuay
NF1-32-T-3	25May84	1232R	36-56-40N	76-23-27W	So.EndPortsmouthQuay
NF1-32-T-4	25May84	1233R	36-56-40N	76-23-27W	So.EndPortsmouthQuay
NF1-32-T-5	25May84	1234R	36-56-40N	76-23-27W	So.EndPortsmouthQuay

Table B-11(w). Water sample station data: Little Creek.

Sample#	Date	Time	Latitude	Longitude	Remarks
LC1-01-W-1	29May84	0852R	36-56-00N	76-10-41W	EntrChBtwnChMkrs#1&2
LC1-02-W-1	29May84	0905R	36-55-41N	76-10-41W	150m SE ofChMarker#4
LC1-03-W-1	29May84	0915R	36-55-24N	76-10-39W	150m NE ofChMarker#8
LC1-03A-W-1	29May84	1048R	36-55-22N	76-10-43W	20ftdeep@Ch.Marker#8
LC1-04-W-1	29May84	0917R	36-55-13N	76-10-13W	DesertCove@LCMRepFac
LC1-05-W-1	29May84	0925R	36-55-04N	76-10-36W	100mWofOpsCntrlTower
LC1-06-W-1	29May84	0934R	36-54-53N	76-09-49W	SoEndLittleCreekCove
LC1-07-W-1	29May84	0938R	36-54-53N	76-10-16W	CenterPhibGruTwoPier
LC1-08-W-1	29May84	0948R	36-54-50N	76-10-44W	AdjMarRailwyTermPier
LC1-08-W-2	29May84	1048R	36-54-50N	76-10-44W	20ftdeep@RwyTermPier
LC1-09-W-1	29May84	0955R	36-54-49N	76-11-02W	AdjFlDryDock@Pier#10
LC1-09A-W-1	29May84	1150R	36-54-43N	76-11-11W	AdjSmlBoatLaunchRamp
LC1-10-W-1	29May84	1000R	36-55-03N	76-10-05W	AdjCenterLST Pier#14
LC1-11-W-1	29May84	1005R	36-55-17N	76-10-57W	Entr Fishermans Cove
LC1-12-W-1	29May84	1010R	36-55-21N	76-11-15W	AdjAssaultCraftUnit2
LC1-13-W-1	29May84	1017R	36-55-25N	76-11-24W	@NewMarinaSlipFishCv
LC1-13-W-2	29May84	1025R	36-55-25N	76-11-24W	@7ft@NewMarinaSlipFC
LC1-13A-W-1	29May84	1125R	36-55-30N	76-11-30W	@MidPierunderHwy60Br

Table B-11(s). Sediment sample station data: Little Creek

Sample#	Latitude(N)	Longitude(W)	Location	Depth
LC1-01-S-1	36-56-00N	76-10-41W	EntrChBtwnChMkrs#1&2	24.0
LC1-01-S-2	36-56-00N	76-10-41W	EntrChBtwnChMkrs#1&2	24.0
LC1-01-S-3	36-56-00N	76-10-41W	EntrChBtwnChMkrs#1&2	24.0
LC1-02-S-1	36-55-41N	76-10-41W	150m SE EntrChMkr#4h	23.0
LC1-02-S-2	36-55-41N	76-10-41W	150m SE Entr.ChMkr#4	23.0
LC1-02-S-3	36-55-41N	76-10-41W	150m SE Entr.ChMkr#4	23.0
LC1-03-S-1	36-55-24N	76-10-39W	150m NE Entr.ChMkr#8	22.0
LC1-03-S-2	36-55-24N	76-10-39W	150m NE Entr.ChMkr#8	22.0
LC1-03-S-3	36-55-24N	76-10-39W	150m NE Entr.ChMkr#8	22.0
LC1-04-S-1	36-55-13N	76-10-13W	DesertCove@LCMRepFac	11.0
LC1-04-S-2	36-55-13N	76-10-13W	DesertCove@LCMRepFac	11.0
LC1-04-S-3	36-55-13N	76-10-13W	DesertCove@LCMRepFac	11.0
LC1-05-S-1	36-55-04N	76-10-36W	100mWofOpsControlTwr	20.0
LC1-05-S-2	36-55-04N	76-10-36W	100mWofOpsControlTwr	20.0
LC1-05-S-3	36-55-04N	76-10-36W	100mWofOpsControlTwr	20.0
LC1-06-S-1	36-54-53N	76-09-49W	EendLCreekCoveMDSU-2	20.0
LC1-06-S-2	36-54-53N	76-09-49W	EendLCreekCoveMDSU-2	20.0
LC1-06-S-3	36-54-53N	76-09-49W	EendLCreekCoveMDSU-2	20.0
LC1-07-S-1	36-54-53N	76-10-16W	EntrLCreekCove(Cntr)	24.0
LC1-07-S-2	36-54-53N	76-10-16W	EntrLCreekCove(Cntr)	24.0
LC1-07-S-3	36-54-53N	76-10-16W	EntrLCreekCove(Cntr)	24.0
LC1-08-S-1	36-54-50N	76-10-44W	AdjMarRailwyTermPier	25.0
LC1-08-S-2	36-54-50N	76-10-44W	AdjMarRailwyTermPier	25.0
LC1-08-S-3	36-54-50N	76-10-44W	AdjMarRailwyTermPier	25.0
LC1-09-S-1	36-54-49N	76-11-02W	AdjFlDryDock@Pier#10	25.0
LC1-09-S-2	36-54-49N	76-11-02W	AdjFlDryDock@Pier#10	25.0
LC1-09-S-3	36-54-49N	76-11-02W	AdjFlDryDock@Pier#10	25.0
LC1-10-S-1	36-55-03N	76-10-05W	Adj2CenterLSTpier#10	24.0
LC1-10-S-2	36-55-03N	76-10-05W	Adj2CenterLSTpier#10	24.0
LC1-10-S-3	36-55-03N	76-10-05W	Adj2CenterLSTpier#10	24.0
LC1-11-S-1	36-55-17N	76-10-57W	Entr Fishermans Cove	20.0
LC1-11-S-2	36-55-17N	76-10-57W	Entr Fishermans Cove	20.0
LC1-11-S-3	36-55-17N	76-10-57W	Entr Fishermans Cove	20.0
LC1-12-S-1	36-55-21N	76-11-15W	AdjAssaultCraftUnit2	15.0
LC1-12-S-2	36-55-21N	76-11-15W	AdjAssaultCraftUnit2	15.0
LC1-12-S-3	36-55-21N	76-11-15W	AdjAssaultCraftUnit2	15.0
LC1-13-S-1	36-55-30N	76-11-30W	7ft@NewMarinaFishCve	8.0
LC1-13-S-2	36-55-30N	76-11-30W	7ft@NewMarinaFishCve	8.0
LC1-13-S-3	36-55-30N	76-11-30W	7ft@NewMarinaFishCve	8.0

Table B-11(t). Tissue sample station data: Little Creek.

Sample#	Date	Time	Latitude	Longitude	Remarks
LC1-03B-T-1	29May84	1100R	36-55-41N	76-10-41W	AcrossChfromChMkr#8
LC1-03B-T-2	29May84	1101R	36-55-41N	76-10-41W	AcrossChfromChMkr#8
LC1-03B-T-3	29May84	1102R	36-55-41N	76-10-41W	AcrossChfromChMkr#8
LC1-03B-T-4	29May84	1103R	36-55-41N	76-10-41W	AcrossChfromChMkr#8
LC1-03B-T-5	29May84	1104R	36-55-41N	76-10-41W	AcrossChfromChMkr#8
LC1-07A-T-1	29May84	1135R	36-54-59N	76-10-26W	MiddlePhibGruTwoPier
LC1-07A-T-2	29May84	1136R	36-54-59N	76-10-26W	MiddlePhibGruTwoPier
LC1-07A-T-3	29May84	1137R	36-54-59N	76-10-26W	MiddlePhibGruTwoPier
LC1-07A-T-4	29May84	1138R	36-54-59N	76-10-26W	MiddlePhibGruTwoPier
LC1-07A-T-5	29May84	1139R	36-54-59N	76-10-26W	MiddlePhibGruTwoPier
LC1-09A-T-1	29May84	1145R	36-54-43N	76-11-11W	AdjBoatLauchFacility
LC1-09A-T-2	29May84	1146R	36-54-43N	76-11-11W	AdjBoatLauchFacility
LC1-09A-T-3	29May84	1147R	36-54-43N	76-11-11W	AdjBoatLauchFacility
LC1-09A-T-4	29May84	1148R	36-54-43N	76-11-11W	AdjBoatLauchFacility
LC1-09A-T-5	29May84	1149R	36-54-43N	76-11-11W	AdjBoatLauchFacility
LC1-13A-T-1	29May84	1120R	36-55-30N	76-11-30W	AdjMidPierUnderHwy60
LC1-13A-T-2	29May84	1121R	36-55-30N	76-11-30W	AdjMidPierUnderHwy60
LC1-13A-T-3	29May84	1122R	36-55-30N	76-11-30W	AdjMidPierUnderHwy60

Table B-12(w). Water sample station data Philadelphia.

Sample#	Date	Time	Latitude	Longitude	Remarks
PA-01-W-1	19Oct85	0920R	39-53-06.8N	75-11-26.9W	15moffCaissonDDk#4PNSY
PA-01-W-2	19Oct85	0921R	39-53-06.8N	75-11-26.9W	15moffCaissonDDk#4PNSY
PA-01-W-3	19Oct85	0922R	39-53-06.8N	75-11-26.9W	15moffCaissonDDk#4PNSY
PA-02-W-1	19Oct85	0950R	39-53-41.4N	75-11-00.8W	CtrResBasn100mSofWrf#N
PA-03-W-1	19Oct85	1003R	39-53-31.3N	75-11-39.1W	AdjBuoy#1@jncSchuylkil
PA-03-W-2	19Oct85	1004R	39-53-31.3N	75-11-39.1W	AdjBuoy#1@jncSchuylkil
PA-03-W-3	19Oct85	1005R	39-53-31.3N	75-11-39.1W	AdjBuoy#1@jncSchuylkil
PA-04-W-1	19Oct85	1045R	39-52-29.5N	75-12-34.8W	10moffSpier@Ft.Mifflin
PA-05-W-1	19Oct85	1110R	39-53-06.7N	75-11-32.0W	15moffCaissonDDk#5PNSY
PA-06-W-1	19Oct85	1130R	39-53-10.4N	75-11-03.2W	10moffCaissonDDk#3PNSY
PA-06-W-2	19Oct85	1131R	39-53-10.4N	75-11-03.2W	10moffCaissonDDk#3PNSY
PA-06-W-3	19Oct85	1132R	39-53-10.4N	75-11-03.2W	10moffCaissonDDk#3PNSY
PA-07-W-1	19Oct85	1147R	39-53-11.5N	75-10-42.4W	100moffCaisonDDk#1PNSY
PA-08-W-1	19Oct85	1204R	39-53-10.4N	75-09-58.2W	10moffendPier#7LeagueI
PA-09-W-1	19Oct85	1235R	39-53-56.4N	75-07-44.8W	10moffCoGardQuay@Gl.Pt
PA-09-W-2	19Oct85	1236R	39-53-56.4N	75-07-44.8W	10moffCoGardQuay@Gl.Pt
PA-09-W-3	19Oct85	1237R	39-53-56.4N	75-07-44.8W	10moffCoGardQuay@Gl.Pt
PA-10-W-1	19Oct85	1245R	39-53-09.2N	75-08-03.1W	5moffCtrBldg@PackerMar
PA-11-W-1	19Oct85	1317R	39-56-05.2N	75-08-24.3W	10moffPier40SPhilaWhrf
PA-12-W-1	19Oct85	1330R	39-56-38.1N	75-08-33W	CtrofPenn'sLndngMarina
PA-12-W-2	19Oct85	1331R	39-56-38.1N	75-08-33W	CtrofPenn'sLndngMarina
PA-12-W-3	19Oct85	1332R	39-56-38.1N	75-08-33W	CtrofPenn'sLndngMarina

Table B-12(s). Sediment sample station data: Philadelphia.

Sample#	Latitude(N)	Longitude(W)	Location	Depth
PA-01-S-1	39-53-06.8N	75-11-26.9W	15moffCaissonDDk#4PNSY	11.5
PA-01-S-2	39-53-06.8N	75-11-26.9W	15moffCaissonDDk#4PNSY	11.5
PA-01-S-3	39-53-06.8N	75-11-26.9W	15moffCaissonDDk#4PNSY	11.5
PA-02-S-1	39-53-41.4N	75-11-00.8W	CtrofResBasin100mSWrfN	11.0
PA-02-S-2	39-53-41.4N	75-11-00.8W	CtrofResBasin100mSWrfN	11.0
PA-02-S-3	39-53-41.4N	75-11-00.8W	CtrofResBasin100mSWrfN	11.0
PA-03-S-1	39-53-31.3N	75-11-39.1W	AdjBuoy1@junxSchuykill	10.0
PA-03-S-2	39-53-31.3N	75-11-39.1W	AdjBuoy1@junxSchuykill	10.0
PA-03-S-3	39-53-31.3N	75-11-39.1W	AdjBuoy1@junxSchuykill	10.0
PA-04-S-1	39-52-29.5N	75-12-34.8W	10moffSpier@Ft.Mifflin	4.0
PA-04-S-2	39-52-29.5N	75-12-34.8W	10moffSpier@Ft.Mifflin	4.0
PA-04-S-3	39-52-29.5N	75-12-34.8W	10moffSpier@Ft.Mifflin	4.0
PA-05-S-1	39-53-06.7N	75-11-32.0W	15moffCaissonDDk#5PNSY	13.0
PA-05-S-2	39-53-06.7N	75-11-32.0W	15moffCaissonDDk#5PNSY	13.0
PA-05-S-3	39-53-06.7N	75-11-32.0W	15moffCaissonDDk#5PNSY	13.0
PA-06-S-1	39-53-10.4N	75-11-03.2W	10moffCaissonDDk#3PNSY	11.0
PA-06-S-2	39-53-10.4N	75-11-03.2W	10moffCaissonDDk#3PNSY	11.0
PA-06-S-3	39-53-10.4N	75-11-03.2W	10moffCaissonDDk#3PNSY	11.0
PA-07-S-1	39-53-11.5N	75-10-42.4W	100mWofCaisonDDk#1PNSY	12.0
PA-07-S-2	39-53-11.5N	75-10-42.4W	100mWofCaisonDDk#1PNSY	12.0
PA-07-S-3	39-53-11.5N	75-10-42.4W	100mWofCaisonDDk#1PNSY	12.0
PA-08-S-1	39-53-10.4N	75-09-58.2W	10moffendPier7LeagueIs	8.5
PA-08-S-2	39-53-10.4N	75-09-58.2W	10moffendPier7LeagueIs	8.5
PA-08-S-3	39-53-10.4N	75-09-58.2W	10moffendPier7LeagueIs	8.5
PA-09-S-1	39-53-56.4N	75-07-44.8W	10mofCOGARDquayGlstrPt	7.0
PA-09-S-2	39-53-56.4N	75-07-44.8W	10mofCOGARDquayGlstrPt	7.0
PA-09-S-3	39-53-56.4N	75-07-44.8W	10mofCOGARDquayGlstrPt	7.0
PA-10-S-1	39-54-09.2N	75-08-03.1W	5moffCtrBldg@PackerMar	9.5
PA-10-S-2	39-54-09.2N	75-08-03.1W	5moffCtrBldg@PackerMar	9.5
PA-10-S-3	39-54-09.2N	75-08-03.1W	5moffCtrBldg@PackerMar	9.5
PA-12-S-1	39-56-38.1N	75-08-33.0W	CenterPenn`sLndgMarina	3.0
PA-12-S-2	39-56-38.1N	75-08-33.0W	CenterPenn`sLndgMarina	3.0
PA-12-S-3	39-56-38.1N	75-08-33.0W	CenterPenn`sLndgMarina	3.0

Table B-13(w). Water sample station data: New London/Groton

Sample#	Date	Time	Latitude	Longitude	Remarks
NL1-01-W-1	08Nov84	1320R	41-18-27N	72-04-55W	AdjBuoy#3-EntThamesR
NL1-01-W-2	08Nov84	1321R	41-18-27N	72-04-55W	AdjBuoy#3-EntThamesR
NL1-01-W-3	08Nov84	1322R	41-18-27N	72-04-55W	AdjBuoy#3-EntThamesR
NL1-02-W-1	08Nov84	1345R	41-19-18N	72-04-55W	AdjBuoys#5&6-ThamesR
NL1-03-W-1	08Nov84	1406R	41-19-58N	72-04-51W	OffPfizerChemicalCo
NL1-04-W-1	08Nov84	1413R	41-20-37N	72-05-25W	OffSoNUSCPierThamesR
NL1-04-W-2	08Nov84	1414R	41-20-37N	72-05-25W	OffSoNUSCPierThamesR
NL1-04-W-3	08Nov84	1415R	41-20-37N	72-05-25W	OffSoNUSCPierThamesR
NL1-05-W-1	08Nov84	1424R	41-20-47N	72-05-17W	OffCanBuoy#11ThamesR
NL1-06-W-1	08Nov84	1441R	41-20-47N	72-05-05W	OffGenDynmx@CntrPier
NL1-06-W-2	08Nov84	1442R	41-20-47N	72-05-05W	OffGenDynmx@CntrPier
NL1-06-W-3	08Nov84	1443R	41-20-47N	72-05-05W	OffGenDynmx@CntrPier
NL1-07-W-1	08Nov84	1453R	41-21-46N	72-05-18W	SsideCntrRRBrgeHwy95
NL1-07-W-2	08Nov84	1454R	41-21-46N	72-05-18W	SsideCntrRRBrgeHwy95
NL1-07-W-3	08Nov84	1455R	41-21-46N	72-05-18W	SsideCntrRRBrgeHwy95
NL1-08-W-1	08Nov84	1508R	41-22-44N	72-05-45W	Adj2USCGdAcademyPier
NL1-09-W-1	08Nov84	1528R	41-23-14N	72-05-35W	Adj2Buoy#9ThamesRivr
NL1-10-W-1	08Nov84	1541R	41-23-25N	72-05-30W	EndPier#2SubaseNLndn
NL1-10-W-2	08Nov84	1542R	41-23-25N	72-05-30W	EndPier#2SubaseNLndn
NL1-10-W-3	08Nov84	1543R	41-23-25N	72-05-30W	EndPier#2SubaseNLndn
NL1-11-W-1	09Nov84	0905R	41-25-02N	72-05-37W	AdjMidChMkr#5Boathse
NL1-11-W-2	09Nov84	0906R	41-25-02N	72-05-37W	AdjMidChMkr#5Boathse
NL1-11-W-3	09Nov84	0907R	41-25-02N	72-05-37W	AdjMidChMkr#5Boathse
NL1-12-W-1	09Nov84	0930R	41-24-18N	72-05-41W	SoSpecSerMarina&DPDO
NL1-13-W-1	09Nov84	0947R	41-24-10N	72-05-42W	NSidePier#33SubaseNL
NL1-13-W-2	09Nov84	0948R	41-24-10N	72-05-42W	NSidePier#33SubaseNL
NL1-13-W-3	09Nov84	0949R	41-24-10N	72-05-42W	NSidePier#33SubaseNL
NL1-14-W-1	09Nov84	0958R	41-24-03N	72-05-53W	@FuelPierWbankThamzR
NL1-15-W-1	09Nov84	1018R	41-23-56N	72-05-38W	@QuaySsidePier17ARDM
NL1-16-W-1	09Nov84	1030R	41-23-49N	72-05-44W	25mNARDM4(Birmngham)
NL1-16-W-2	09Nov84	1031R	41-23-49N	72-05-44W	25mNARDM4(Birmngham)
NL1-16-W-3	09Nov84	1032R	41-23-49N	72-05-44W	25mNARDM4(Birmngham)
NL1-17-W-1	09Nov84	1048R	41-23-46N	72-05-52W	10mEBuoy#11-WBankThR
NL1-18-W-1	09Nov84	1055R	41-23-40N	72-05-40W	10moffEendPier#12ThR
NL1-19-W-1	09Nov84	1106R	41-23-37N	72-05-38W	10moffEendPier#10ThR
NL1-19-W-2	09Nov84	1107R	41-23-37N	72-05-38W	10moffEendPier#10ThR
NL1-19-W-3	09Nov84	1108R	41-23-37N	72-05-38W	10moffEendPier#10ThR
NL1-20-W-1	09Nov84	1125R	41-23-35N	72-05-31W	NsidePier#8AdjBldg20
NL1-21-W-1	12Nov84	0653R	41-20-55N	72-05-59W	@CrockrShpYdShawCove
NL1-21-W-2	12Nov84	0654R	41-20-55N	72-05-59W	@CrockrShpYdShawCove
NL1-21-W-3	12Nov84	0655R	41-20-55N	72-05-59W	@CrockrShpYdShawCove
NL1-22-W-1	12Nov84	0705R	41-20-07N	72-05-52W	CenterofBurr'sMarina
NL1-22-W-2	12Nov84	0706R	41-20-07N	72-05-52W	CenterofBurr'sMarina
NL1-22-W-3	12Nov84	0707R	41-20-07N	72-05-52W	CenterofBurr'sMarina

Table B-13(s). Sediment sample station data: New London/Groton.

Sample#	Latitude(N)	Longitude(W)	Location	Depth
NL1-01-S-1	41-18-27N	72-04-55W	AdjBuoy#3-EntThamesR	10.0
NL1-01-S-2	41-18-27N	72-04-55W	AdjBuoy#3-EntThamesR	10.0
NL1-01-S-3	41-18-27N	72-04-55W	AdjBuoy#3-EntThamesR	10.0
NL1-02-S-1	41-19-18N	72-04-55W	AdjBuoys#5&6-ThamesR	9.0
NL1-02-S-2	41-19-18N	72-04-55W	AdjBuoys#5&6-ThamesR	9.0
NL1-02-S-3	41-19-18N	72-04-55W	AdjBuoys#5&6-ThamesR	9.0
NL1-03-S-1	41-19-58N	72-04-51W	AdjPfizerChemThamesR	7.0
NL1-03-S-2	41-19-58N	72-04-51W	AdjPfizerChemThamesR	7.0
NL1-03-S-3	41-19-58N	72-04-51W	AdjPfizerChemThamesR	7.0
NL1-04-S-1	41-20-37N	72-05-25W	AdjSoNUSCPierThamesR	6.0
NL1-04-S-2	41-20-37N	72-05-25W	AdjSoNUSCPierThamesR	6.0
NL1-04-S-3	41-20-37N	72-05-25W	AdjSoNUSCPierThamesR	6.0
NL1-05-S-1	41-20-47N	72-05-17W	AdjBuoy#11ThamesRivr	8.5
NL1-05-S-2	41-20-47N	72-05-17W	AdjBuoy#11ThamesRivr	8.5
NL1-05-S-3	41-20-47N	72-05-17W	AdjBuoy#11ThamesRivr	8.5
NL1-06-S-1	41-20-47N	72-05-05W	Adj2GenDynmxCntrPier	9.0
NL1-06-S-2	41-20-47N	72-05-05W	Adj2GenDynmxCntrPier	9.0
NL1-06-S-3	41-20-47N	72-05-05W	Adj2GenDynmxCntrPier	9.0
NL1-07-S-1	41-21-46N	72-05-18W	AdjSsideRR@Hwy95Brdg	12.0
NL1-07-S-2	41-21-46N	72-05-18W	AdjSsideRR@Hwy95Brdg	12.0
NL1-07-S-3	41-21-46N	72-05-18W	AdjSsideRR@Hwy95Brdg	12.0
NL1-08-S-1	41-22-44N	72-05-45W	AdjUSCGAcademyPierBE	6.0
NL1-08-S-2	41-22-44N	72-05-45W	AdjUSCGAcademyPierBE	6.0
NL1-08-S-3	41-22-44N	72-05-45W	AdjUSCGAcademyPierBE	6.0
NL1-09-S-1	41-23-14N	72-05-35W	AdjBuoy#9ThamesRiver	8.0
NL1-09-S-2	41-23-14N	72-05-35W	AdjBuoy#9ThamesRiver	8.0
NL1-09-S-3	41-23-14N	72-05-35W	AdjBuoy#9ThamesRiver	8.0
NL1-10-S-1	41-23-25N	72-05-30W	AdjPier#2ThamesRiver	11.5
NL1-10-S-2	41-23-25N	72-05-30W	AdjPier#2ThamesRiver	11.5
NL1-10-S-3	41-23-25N	72-05-30W	AdjPier#2ThamesRiver	11.5
NL1-11-S-1	41-25-02N	72-05-37W	AdjMidChMkr#5Boathse	3.5
NL1-11-S-2	41-25-02N	72-05-37W	AdjMidChMkr#5Boathse	3.5
NL1-11-S-3	41-25-02N	72-05-37W	AdjMidChMkr#5Boathse	3.5
NL1-12-S-1	41-24-18N	72-05-41W	SofSpecSerMarinaPier	6.0
NL1-12-S-2	41-24-18N	72-05-41W	SofSpecSerMarinaPier	6.0
NL1-12-S-3	41-24-18N	72-05-41W	SofSpecSerMarinaPier	6.0
NL1-13-S-1	41-24-10N	72-05-42W	AdjNsidePier#33Thame	12.5
NL1-13-S-2	41-24-10N	72-05-42W	AdjNsidePier#33Thame	12.5
NL1-13-S-3	41-24-10N	72-05-42W	AdjNsidePier#33Thame	12.5
NL1-14-S-1	41-24-03N	72-05-53W	AdjFuelPierWsideThmz	6.0
NL1-14-S-2	41-24-03N	72-05-53W	AdjFuelPierWsideThmz	6.0
NL1-14-S-3	41-24-03N	72-05-53W	AdjFuelPierWsideThmz	6.0
NL1-15-S-1	41-23-56N	72-05-38W	AdjquaySpier#17@AFDM	5.5
NL1-15-S-2	41-23-56N	72-05-38W	AdjquaySpier#17@AFDM	5.5
NL1-15-S-3	41-23-56N	72-05-38W	AdjquaySpier#17@AFDM	5.5
NL1-16-S-1	41-23-49N	72-05-44W	15mNofARDM(Thames R)	19.0
NL1-16-S-2	41-23-49N	72-05-44W	15mNofARDM(Thames R)	19.0
NL1-16-S-3	41-23-49N	72-05-44W	15mNofARDM(Thames R)	19.0
NL1-17-S-1	41-23-46N	72-05-52W	10mEofBuoy#11-westbk	10.0
NL1-17-S-2	41-23-46N	72-05-52W	10mEofBuoy#11-westbk	10.0

Table B-13(s). Sediment sample station data: New London/Groton (continued).

Sample#	Latitude(N)	Longitude(W)	Location	Depth
NL1-17-S-3	41-23-46N	72-05-52W	10mEofBuoy#11-westbk	10.0
NL1-18-S-1	41-23-40N	72-05-40W	10moffPier#12-Thames	12.5
NL1-18-S-2	41-23-40N	72-05-40W	10moffPier#12-Thames	12.5
NL1-18-S-3	41-23-40N	72-05-40W	10moffPier#12-Thames	12.5
NL1-19-S-1	41-23-37N	72-05-38W	10moffPier#10-Thames	11.5
NL1-19-S-2	41-23-37N	72-05-38W	10moffPier#10-Thames	11.5
NL1-19-S-3	41-23-37N	72-05-38W	10moffPier#10-Thames	11.5
NL1-20-S-1	41-23-35N	72-05-31W	Nside@Pier#10-Thames	12.5
NL1-20-S-2	41-23-35N	72-05-31W	Nside@Pier#10-Thames	12.5
NL1-20-S-3	41-23-35N	72-05-31W	Nside@Pier#10-Thames	12.5

Table B-13(t). Tissue sample station data: New London/Groton.

Sample#	Date	Time	Latitude	Longitude	Remarks
NL1-07-T-1	9NOV85	1346R	41-21-46N	72-05-18W	SsideCntrRRBrgeHwy95
NL1-07-T-2	9NOV85	1347R	41-21-46N	72-05-18W	SsideCntrRRBrgeHwy95
NL1-07-T-3	9NOV85	1348R	41-21-46N	72-05-18W	SsideCntrRRBrgeHwy95
NL1-07-T-4	9NOV85	1349R	41-21-46N	72-05-18W	SsideCntrRRBrgeHwy95
NL1-07-T-5	9NOV85	1350R	41-21-46N	72-05-18W	SsideCntrRRBrgeHwy95
NL1-08-T-1	9NOV85	1415R	41-22-44N	72-05-45W	Adj2USCGdAcademyPier
NL1-08-T-2	9NOV85	1416R	41-22-44N	72-05-45W	Adj2USCGdAcademyPier
NL1-08-T-3	9NOV85	1417R	41-22-44N	72-05-45W	Adj2USCGdAcademyPier
NL1-08-T-4	9NOV85	1418R	41-22-44N	72-05-45W	Adj2USCGdAcademyPier
NL1-08-T-5	9NOV85	1419R	41-22-44N	72-05-45W	Adj2USCGdAcademyPier
NL1-20-T-1	9NOV85	1511R	41-23-35N	72-05-31W	NsidePier#8AdjBldg20
NL1-20-T-2	9NOV85	1512R	41-23-35N	72-05-31W	NsidePier#8AdjBldg20
NL1-20-T-3	9NOV85	1513R	41-23-35N	72-05-31W	NsidePier#8AdjBldg20
NL1-20-T-4	9NOV85	1514R	41-23-35N	72-05-31W	NsidePier#8AdjBldg20
NL1-20-T-5	9NOV85	1515R	41-23-35N	72-05-31W	NsidePier#8AdjBldg20
NL1-14-T-1	9NOV85	1443R	41-24-03N	72-05-53W	@FuelPierWbankThamzR
NL1-14-T-2	9NOV85	1444R	41-24-03N	72-05-53W	@FuelPierWbankThamzR
NL1-14-T-3	9NOV85	1445R	41-24-03N	72-05-53W	@FuelPierWbankThamzR
NL1-14-T-4	9NOV85	1446R	41-24-03N	72-05-53W	@FuelPierWbankThamzR
NL1-14-T-5	9NOV85	1447R	41-24-03N	72-05-53W	@FuelPierWbankThamzR

Table B-14(w). Water sample station data: Newport

Sample#	Date	Time	Latitude	Longitude	Remarks
NP-01-W-1	16OCT85	1007R	41-27-16.0N	71-21-52.8W	250mSSEofBuoy#6-EntrCh
NP-01-W-2	16OCT85	1008R	41-27-16.0N	71-21-52.8W	250mSSEofBuoy#6-EntrCh
NP-01-W-3	16OCT85	1009R	41-27-16.0N	71-21-52.8W	250mSSEofBuoy#6-EntrCh
NP-02-W-1	16OCT85	1021R	41-27-49.9N	71-21-34.1W	CtrCastleHillCGStaCove
NP-03-W-1	16OCT85	1043R	41-28-54.1N	71-20-10.5W	100mNBuoy#4offFt.Adams
NP-03-W-2	16OCT85	1044R	41-28-54.1N	71-20-10.5W	100mNBuoy#4offFt.Adams
NP-03-W-3	16OCT85	1045R	41-28-54.1N	71-20-10.5W	100mNBuoy#4offFt.Adams
NP-04-W-1	16OCT85	1100R	41-28-40.7N	71-19-41W	250NNWIdaLewisRockPier
NP-05-W-1	16OCT85	1116R	41-28-03.8N	71-19-06W	10mSofNewportCommWharf
NP-06-W-1	16OCT85	1126R	41-29-17N	71-19-05.5W	CtrNewportYtClubMarina
NP-06-W-2	16OCT85	1127R	41-29-17N	71-19-05.5W	CtrNewportYtClubMarina
NP-06-W-3	16OCT85	1128R	41-29-17N	71-19-05.5W	CtrNewportYtClubMarina
NP-07-W-1	16OCT85	1140R	41-29-21.8N	71-19-23W	CtrNewportOffshoreBWrx
NP-08-W-1	16OCT85	1150R	41-30-18.5N	71-19-35.5W2	CtrNwptNavyMarinaOClub
NP-09-W-1	16OCT85	1205R	41-31-23.8N	71-18-59.1W	S-endCdingtnCove@Buoys
NP-10-W-1	16OCT85	1220R	41-31-51.5N	71-19-04.5W	30moffNUSCPier(@FF1056
NP-10-W-2	16OCT85	1221R	41-31-51.5N	71-19-04.5W	30moffNUSCPier(@FF1056
NP-10-W-3	16OCT85	1222R	41-31-51.5N	71-19-04.5W	30moffNUSCPier(@FF1056
NP-11-W-1	16OCT85	1235R	41-31-57.4N	71-20-48.9W	WsideGouldIsoffoldpilz
NP-11-W-2	16OCT85	1236R	41-31-57.4N	71-20-48.9W	WsideGouldIsoffoldpilz
NP-11-W-3	16OCT85	1237R	41-31-57.4N	71-20-48.9W	WsideGouldIsoffoldpilz
NP-12-W-1	16OCT85	1310R	41-35-24.4N	71-17-08.1W	CtrBendBoatBasinMarina
NP-12-W-2	16OCT85	1311R	41-35-24.4N	71-17-08.1W	CtrBendBoatBasinMarina
NP-12-W-3	16OCT85	1312R	41-35-24.4N	71-17-08.1W	CtrBendBoatBasinMarina

Table B-14(s). Sediment sample station data: Newport

Sample#	Latitude(N)	Longitude(W)	Location	Depth
=======	===========	============	========	=====
NP-01-S-1	41-27-16N	71-21-52.8W	250SSEoBuoy#6-EntrChnl	18.0
NP-01-S-2	41-27-16N	71-21-52.8W	250SSEoBuoy#6-EntrChnl	18.0
NP-01-S-3	41-27-16N	71-21-52.8W	250SSEoBuoy#6-EntrChnl	18.0
NP-02-S-1	41-27-49.9N	71-21-31.8W	CtrCastleHillCoGrdCove	5.0
NP-02-S-2	41-27-49.9N	71-21-31.8W	CtrCastleHillCoGrdCove	5.0
NP-02-S-3	41-27-49.9N	71-21-31.8W	CtrCastleHillCoGrdCove	5.0
NP-03-S-1	41-28-54.1N	71-20-10.5W	100mNBuoy#4-offFtAdams	13.0
NP-03-S-2	41-28-54.1N	71-20-10.5W	100mNBuoy#4-offFtAdams	13.0
NP-03-S-3	41-28-54.1N	71-20-10.5W	100mNBuoy#4-offFtAdams	13.0
NP-04-S-1	41-28-40.7N	71-19-41W	250mNNWIdaLewisPierMar	7.0
NP-04-S-2	41-28-40.7N	71-19-41W	250mNNWIdaLewisPierMar	7.0
NP-04-S-3	41-28-40.7N	71-19-41W	250mNNWIdaLewisPierMar	7.0
NP-05-S-1	41-29-03.8N	71-19-06W	10mSoNewportComm Wharf	6.0
NP-05-S-2	41-29-03.8N	71-19-06W	10mSoNewportComm Wharf	6.0
NP-05-S-3	41-29-03.8N	71-19-06W	10mSoNewportComm Wharf	6.0
NP-06-S-1	41-29-17N	71-19-05.5W	CenterNwportYchtClbMar	6.0
NP-06-S-2	41-29-17N	71-19-05.5W	CenterNwportYchtClbMar	6.0
NP-06-S-3	41-29-17N	71-19-05.5W	CenterNwportYchtClbMar	6.0
NP-07-S-1	41-29-21.8N	71-19-23W	CenterNwprtOffshBtWrks	6.0
NP-07-S-2	41-29-21.8N	71-19-23W	CenterNwprtOffshBtWrks	6.0
NP-07-S-3	41-29-21.8N	71-19-23W	CenterNwprtOffshBtWrks	6.0
NP-08-S-1	41-30-18.4N	71-19-35.5W	CtrNewportO'ClubMarina	2.0
NP-08-S-2	41-30-18.4N	71-19-35.5W	CtrNewportO'ClubMarina	2.0
NP-08-S-3	41-30-18.4N	71-19-35.5W	CtrNewportO'ClubMarina	2.0
NP-09-S-1	41-31-23.8N	71-18-59.1W	SoSideCodngtnCove@bfld	11.0
NP-09-S-2	41-31-23.8N	71-18-59.1W	SoSideCodngtnCove@bfld	11.0
NP-09-S-3	41-31-23.8N	71-18-59.1W	SoSideCodngtnCove@bfld	11.0
NP-10-S-1	41-31-51.5N	71-19-04.5W	30mNofNUSCPier(@FF1056	12.0
NP-10-S-2	41-31-51.5N	71-19-04.5W	30mNofNUSCPier(@FF1056	12.0
NP-10-S-3	41-31-51.5N	71-19-04.5W	30mNofNUSCPier(@FF1056	12.0
NP-11-S-1	41-31-57.4N	71-20-48.9W	WsideGouldIs@oldpilngs	8.0
NP-11-S-2	41-31-57.4N	71-20-48.9W	WsideGouldIs@oldpilngs	8.0
NP-11-S-3	41-31-57.4N	71-20-48.9W	WsideGouldIs@oldpilngs	8.0
NP-12-S-1	41-35-24.4N	71-17-08.1W	CtrBendBoatBasinMarina	4.0
NP-12-S-2	41-35-24.4N	71-17-08.1W	CtrBendBoatBasinMarina	4.0
NP-12-S-3	41-35-24.4N	71-17-08.1W	CtrBendBoatBasinMarina	4.0

Table B-14(t). Tissue sample station data: Newport

Sample#	Date	Time	Latitude	Longitude	Remarks
NP-05-T-1	16Oct85	1500R	41-29-02.8N	71-19-03.2W	Offpilings75mSEofSta#5
NP-05-T-2	16Oct85	1502R	41-29-02.8N	71-19-03.2W	Offpilings75mSEofSta#5
NP-05-T-3	16Oct85	1504R	41-29-02.8N	71-19-03.2W	Offpilings75mSEofSta#5
NP-05-T-4	16Oct85	1506R	41-29-02.8N	71-19-03.2W	Offpilings75mSEofSta#5
NP-05-T-5	16Oct85	1508R	41-29-02.8N	71-19-03.2W	Offpilings75mSEofSta#5
NP-10-T-1	16Oct85	1525R	41-31-51.3N	71-18-57W	Offpier@NUSC100mfmSt10
NP-10-T-2	16Oct85	1527R	41-31-51.3N	71-18-57W	Offpier@NUSC100mfmSt10
NP-10-T-3	16Oct85	1529R	41-31-51.3N	71-18-57W	Offpier@NUSC100mfmSt10
NP-10-T-4	16Oct85	1531R	41-31-51.3N	71-18-57W	Offpier@NUSC100mfmSt10
NP-10-T-5	16Oct85	1533R	41-31-51.3N	71-18-57W	Offpier@NUSC100mfmSt10
NP-11-T-1	16Oct85	1450R	41-31-57.4N	71-20-48.9W	WSideGouldIs@OldWdPier
NP-11-T-2	16Oct85	1452R	41-31-57.4N	71-20-48.9W	WSideGouldIs@OldWdPier
NP-11-T-3	16Oct85	1454R	41-31-57.4N	71-20-48.9W	WSideGouldIs@OldWdPier
NP-11-T-4	16Oct85	1456R	41-31-57.4N	71-20-48.9W	WSideGouldIs@OldWdPier
NP-11-T-5	16Oct85	1458R	41-31-57.4N	71-20-48.9W	WSideGouldIs@OldWdPier
NP-12-T-1	16Oct85	1420R	41-35-24.4N	71-17-08.1W	CtrBendBoatBasinMarina
NP-12-T-2	16Oct85	1422R	41-35-24.4N	71-17-08.1W	CtrBendBoatBasinMarina
NP-12-T-3	16Oct85	1424R	41-35-24.4N	71-17-08.1W	CtrBendBoatBasinMarina
NP-12-T-4	16Oct85	1426R	41-35-24.4N	71-17-08.1W	CtrBendBoatBasinMarina
NP-12-T-5	16Oct85	1428R	41-35-24.4N	71-17-08.1W	CtrBendBoatBasinMarina

Table B-15(w). Water sample station data: Portsmouth.

Sample#	Date	Time	Latitude	Longitude	Remarks
PT-01-W-1	12Oct85	1002R	43-03-40.5N	70-42-32.5W	100mWofBuoy#2EntrChanl
PT-01-W-2	12Oct85	1003R	43-03-40.5N	70-42-32.5W	100mWofBuoy#2EntrChanl
PT-01-W-3	12Oct85	1004R	43-03-40.5N	70-42-32.5W	100mWofBuoy#2EntrChanl
PT-02-W-1	12Oct85	1025R	43-04-20.4N	70-42-38.9W	10mEofCoastGdPier-FtPt
PT-03-W-1	12Oct85	1048R	43-04-49.8N	70-42-15W	CenterofPepperrelCove
PT-03-W-2	12Oct85	1049R	43-04-49.8N	70-42-15W	CenterofPepperrelCove
PT-03-W-3	12Oct85	1050R	43-04-49.8N	70-42-15W	CenterofPepperrelCove
PT-04-W-1	12Oct85	1103R	43-04-42.5N	70-43-34.2W	CenterofOldNavySndBasn
PT-04-W-2	12Oct85	1104R	43-04-42.5N	70-43-34.2W	CenterofOldNavySndBasn
PT-04-W-3	12Oct85	1105R	43-04-42.5N	70-43-34.2W	CenterofOldNavySndBasn
PT-05-W-1	12Oct85	1122R	43-04-45.3N	70-44-19.7W	20moffCasonDryDk#2PNSY
PT-06-W-1	12Oct85	1133R	43-04-50.7N	70-44-40.5W	AdjBerth11CNofFltIrnPr
PT-06-W-2	12Oct85	1134R	43-04-50.7N	70-44-40.5W	AdjBerth11CNofFltIrnPr
PT-06-W-3	12Oct85	1135R	43-04-50.7N	70-44-40.5W	AdjBerth11CNofFltIrnPr
PT-07-W-1	12Oct85	1150R	43-04-58.8N	70-44-44.9W	15mNofPieroffBerth#14
PT-08-W-1	12Oct85	1233R	43-04-40.2N	70-45-07.5W	AdjPrescottParkMarRWay
PT-09-W-1	12Oct85	1252R	43-04-52.2N	70-45-17.5W	Badger'sIsMarina(Cntr)
PT-09-W-2	12Oct85	1253R	43-04-52.2N	70-45-17.5W	Badger'sIsMarina(Cntr)
PT-09-W-3	12Oct85	1254R	43-04-52.2N	70-45-17.5W	Badger'sIsMarina(Cntr)
PT-10-W-1	12Oct85	1314R	43-05-46.2N	70-46-00W	JerrysMarina-SpinneyCr
PT-11-W-1	14Oct85	1102R	43-06-51.1N	70-51-01.3W	WsideFoxPt-AdjEntrLBay
PT-11-W-2	14Oct85	1103R	43-06-51.1N	70-51-01.3W	WsideFoxPt-AdjEntrLBay
PT-11-W-3	14Oct85	1104R	43-06-51.1N	70-51-01.3W	WsideFoxPt-AdjEntrLBay
PT-12-W-1	14Oct85	1200R	43-06-56.5N	70-50-13.5W	GreatBayMarinaBroadBay

Table B-15(s). Sediment sample station data: Portsmouth.

Sample#	Latitude(N)	Longitude(W)	Location	Depth
PT-01-S-1	43-03-56N	70-42-32.5W	120mSWofBuoy#3EntrCh	15.0
PT-01-S-2	43-03-40.5N	70-42-32.5W	120mSWofBuoy#3EntrCh	15.0
PT-01-S-3	43-03-40.5N	70-42-32.5W	100mSWofBuoy#3EntrCh	15.0
PT-02-S-1	43-04-20.4N	70-42-42.8W	75mNCoastGdPier-FtPt	10.0
PT-03-S-2	43-04-49.8N	70-42-42.8W	75mNCoastGdPier-FtPt	10.0
PT-03-S-3	43-04-49.8N	70-42-42.8W	75mNCoastGdPier-FtPt	10.0
PT-03-S-1	43-04-49.8N	70-42-15W	Center-PepperrelCove	6.0
PT-03-S-2	43-04-49.8N	70-42-15W	Center-PepperrelCove	6.0
PT-03-S-3	43-04-49.8N	70-42-15W	Center-PepperrelCove	6.0
PT-04-S-1	43-04-42.5N	70-43-34.2W	Center-OldNavySndBsn	11.0
PT-04-S-2	43-04-42.5N	70-43-34.2W	Center-OldNavySndBsn	11.0
PT-04-S-3	43-04-42.5N	70-43-34.2W	Center-OldNavySndBsn	11.0
PT-05-S-1	43-04-45.3N	70-44-19.7W	20moffCasn-DryDock#2	11.0
PT-05-S-2	43-04-45.3N	70-44-19.7W	20moffCasn-DryDock#2	11.0
PT-05-S-3	43-04-45.3N	70-44-19.7W	20moffCasn-DryDock#2	11.0
PT-06-S-1	43-04-50.7N	70-44-40.5W	AdjBerth11CNofFltIrn	13.0
PT-06-S-2	43-04-50.7N	70-44-40.5W	AdjBerth11CNofFltIrn	13.0
PT-06-S-3	43-04-50.7N	70-44-40.5W	AdjBerth11CNofFltIrn	13.0
PT-07-S-1	43-04-58.8N	70-44-44.9W	15mNPier@Berth14PNSY	7.0
PT-07-S-2	43-04-58.8N	70-44-44.9W	15mNPier@Berth14PNSY	7.0
PT-07-S-3	43-04-58.8N	70-44-44.9W	15mNPier@Berth14PNSY	7.0
PT-08-S-1	43-04-40.2N	70-45-07.9W	AdjPrescottPkMarRWay	4.0
PT-08-S-2	43-04-40.2N	70-45-07.9W	AdjPrescottPkMarRWay	4.0
PT-08-S-3	43-04-40.2N	70-45-07.9W	AdjPrescottPkMarRWay	4.0
PT-09-S-1	43-04-52.2N	70-45-17.5W	Badger'sIslandMarina	8.0
PT-09-S-2	43-04-52.2N	70-45-17.5W	Badger'sIslandMarina	8.0
PT-09-S-3	43-04-52.2N	70-45-17.5W	Badger'sIslandMarina	8.0
PT-10-S-1	43-05-46.2N	70-46-00W	Jerry's Marina-Eliot	3.5
PT-10-S-2	43-05-46.2N	70-46-00W	Jerry's Marina-Eliot	3.5
PT-10-S-3	43-05-46.2N	70-46-00W	Jerry's Marina-Eliot	3.5
PT-11-S-1	43-06-51.1N	70-51-01.3W	WSideFoxPt-LittleBay	0.3
PT-11-S-2	43-06-51.1N	70-51-01.3W	WSideFoxPt-LittleBay	0.3
PT-11-S-3	43-06-51.1N	70-51-01.3W	WSideFoxPt-LittleBay	0.3
PT-12-S-1	43-06-56.5N	70-50-13.5W	GreatBayMarinaBrdCve	4.0
PT-12-S-2	43-06-56.5N	70-50-13.5W	GreatBayMarinaBrdCve	4.0
PT-12-S-3	43-06-56.5N	70-50-13.5W	GreatBayMarinaBrdCve	4.0

Table B-15(t). Tissue sample station data: Portsmouth.

Sample#	Date	Time	Latitude	Longitude	Remarks
PT-02-T-1	12Oct85	1450R	43-04-19N	70-42-42.5W	FmCoastGdPilings@FtPnt
PT-02-T-2	12Oct85	1452R	43-04-19N	70-42-42.5W	FmCoastGdPilings@FtPnt
PT-02-T-3	12Oct85	1454R	43-04-19N	70-42-42.5W	FmCoastGdPilings@FtPnt
PT-02-T-4	12Oct85	1456R	43-04-19N	70-42-42.5W	FmCoastGdPilings@FtPnt
PT-02-T-5	12Oct85	1458R	43-04-19N	70-42-42.5W	FmCoastGdPilings@FtPnt
PT-03a-T-1	12Oct85	1500R	43-04-39.5N	70-42-13.5W	FmRksSofPepperrelCove
PT-03a-T-2	12Oct85	1502R	43-04-39.5N	70-42-13.5W	FmRksSofPepperrelCove
PT-03a-T-3	12Oct85	1504R	43-04-39.5N	70-42-13.5W	FmRksSofPepperrelCove
PT-03a-T-4	12Oct85	1506R	43-04-39.5N	70-42-13.5W	FmRksSofPepperrelCove
PT-03a-T-5	12Oct85	1508R	43-04-39.5N	70-42-13.5W	FmRksSofPepperrelCove
PT-04-T-1	12Oct85	1520R	43-04-40.2N	70-43-38.2W	OffCntrPier-NavySndBsn
PT-04-T-2	12Oct85	1522R	43-04-40.2N	70-43-38.2W	OffCntrPier-NavySndBsn
PT-04-T-3	12Oct85	1524R	43-04-40.2N	70-43-38.2W	OffCntrPier-NavySndBsn
PT-04-T-4	12Oct85	1526R	43-04-40.2N	70-43-38.2W	OffCntrPier-NavySndBsn
PT-04-T-5	12Oct85	1528R	43-04-40.2N	70-43-38.2W	OffCntrPier-NavySndBsn
PT-05-T-1	12Oct85	1550R	43-04-45.7N	70-44-20.9W	FmCncrteWendSlp@DryDk2
PT-05-T-2	12Oct85	1552R	43-04-45.7N	70-44-20.9W	FmCncrteWendSlp@DryDk2
PT-05-T-3	12Oct85	1554R	43-04-45.7N	70-44-20.9W	FmCncrteWendSlp@DryDk2
PT-05-T-4	12Oct85	1556R	43-04-45.7N	70-44-20.9W	FmCncrteWendSlp@DryDk2
PT-05-T-5	12Oct85	1558R	43-04-45.7N	70-44-20.9W	FmCncrteWendSlp@DryDk2
PT-09-T-1	12Oct85	1425R	43-04-54N	70-45-17W	OffRks@BadgersIsMarina
PT-09-T-2	12Oct85	1427R	43-04-54N	70-45-17W	OffRks@BadgersIsMarina
PT-09-T-3	12Oct85	1429R	43-04-54N	70-45-17W	OffRks@BadgersIsMarina
PT-09-T-4	12Oct85	1431R	43-04-54N	70-45-17W	OffRks@BadgersIsMarina
PT-09-T-5	12Oct85	1433R	43-04-54N	70-45-17W	OffRks@BadgersIsMarina

APPENDIX C

SAMPLE ANALYSIS DATA

ABBREVIATIONS KEY

NM	=	Not Measurable; butyltin species present in sample, but below measurable levels; trace
UN	=	Undetectable; no trace; below detection limits
ND	=	No Data; results not available; sample not analyzed
*	=	Analytical determination of sample interfered with by matrix effects
LOST	=	Sample container damaged or lost; analytical determination of sample not possible

****

Water values are reported in micrograms/liter (ppb) as chloride.

Sediment values are reported in ngSn/g (ppb) dry weight for total organic solvent extractable tin.

Tissue values are reported in microgramsSn/g (ppm) dry weight and wet weight for total organic solvent extractable tin.

Table C-1(w). Water sample organotin data: San Diego Bay.

Sample#	Remarks	BuSn	Bu2Sn	Bu3Sn	Total Butyltin (ug/L)
SD1-01A-W-1	Adj.jetty end EntrPt	0.006	NM	NM	0.006
SD1-02A-W-1	Offpltfm200SBallstPt	NM	NM	0.026	0.026
SD1-04-W-1	SUBASE-Nsidelongpier	0.008	0.018	0.030	0.056
SD1-04-W-2	SUBASE-Nsidelongpier	0.010	0.014	0.028	0.052
SD1-06-W-1	Sta 6A-No.Is.S pier	0.006	NM	0.023	0.029
SD1-07-W-1	@EntrShelterIsMarina	0.088	0.210	0.187	0.485
SD1-08-W-1	ShltrIsAdjMidChMkr#9	0.010	0.340	0.300	0.650
SD1-09-W-1	ShltrIs-offYachtClub	0.060	0.390	0.350	0.800
SD1-09-W-2	ShltrIs-offYachtClub	0.080	0.361	0.350	0.791
SD1-10-W-1	CommBasin-@BaliHaidk	NM	0.008	0.009	0.017
SD1-11-W-1	CommBasin-AdjChMkr#2	0.012	0.160	0.189	0.361
SD1-12-W-1	CBasin-offKMarRailwy	0.060	0.200	0.197	0.457
SD1-12-W-2	CBasin-offKMarRailwy	0.030	0.170	0.190	0.390
SD1-13-W-1	Adj.tobuoy#21-midbay	NM	0.007	0.020	0.030
SD1-14-W-1	NorthTunaFlt-midpier	0.010	0.028	0.025	0.063
SD1-15-W-1	OffNorthIs CVA Pier	0.010	0.020	0.030	0.060
SD1-15-W-2	OffNorIs SECruzrPier	NM	0.007	0.005	0.012
SD1-16-W-1	5thAveMarina-N end	NM	0.052	0.046	0.098
SD1-16-W-2	5thAveMarina-btn3&4	NM	0.057	0.056	0.115
SD1-16-W-3	5thAveMarina-Entr Ch	0.005	0.019	0.027	0.051
SD1-17-W-1	Campbell Shpyd-offDD	NM	0.020	0.032	0.057
SD1-18-W-1	CoronadoBrdge-pier19	NM	0.011	0.008	0.019
SD1-19-W-1	Adj.NASSCOShydFlDDok	0.005	0.027	0.018	0.050
SD1-20-W-1	NAVSTA-NRngeadjpier2	0.005	0.017	0.014	0.036
SD1-22-W-1	NAVSTA-NRngeendpier1	NM	0.009	0.008	0.017
SD1-24-W-1	Adj. to buoy #26	0.008	0.010	0.020	0.038
SD1-26-W-1	@26A-NEtipAmphibBase	NM	0.025	0.015	0.040
SD1-27-W-1	NAVSTA-SsidePier3	UN	UN	0.010	0.010
SD1-29-W-1	NAVSTA-MidRngePier#5	0.005	0.012	0.024	0.041
SD1-31-W-1	NAVSTA-end of Pier#5	UN	UN	UN	UN
SD1-33-W-1	NAVSTA-MidRngeSoBay	0.010	0.020	0.030	0.060
SD1-36-W-1	NAVSTA-MidRngeWendSS	NM	NM	NM	NM
SD1-38-W-1	NAVSTA-end of Pier#8	NM	NM	0.015	0.015
SD1-39-W-1	NAVSTA-Nside of Mole	0.009	NM	0.004	0.013
SD1-40-W-1	NAVSTA-SRngebtw11&12	NM	NM	0.012	0.012
SD1-42-W-1	NAVSTA-SRnge@buoy#34	NM	NM	0.016	0.016
SD1-44-W-1	NAVSTA-SRngeWendSlvr	NM	NM	0.016	0.016
SD1-44A-W-1	CrndoCays@NChMkr#2	NM	0.020	0.010	0.030
SD1-46-W-1	@ChMkr#1ChulaVSmBBsn	NM	NM	NM	NM
SD1-48-W-1	NWofSDG&EleveeSo.Bay	NM	0.010	NM	0.010
SD1-48A-W-1	CrndoCaysSCh@Mkr#22	NM	NM	NM	NM
SD1-49-W-1	IntkeCh-SDG&E So.Bay	NM	0.009	0.010	0.019
SD1-49A-W-1	ChulaVstaSmBoatBsnFP	ND	ND	ND	ND
SD1-50-W-1	DischgChforSDG&EPlnt	UN	UN	UN	UN
SD1-51-W-1	Offtipof SDG&E levee	NM	NM	NM	NM
SD1-52-W-1	SmstSDBaySiteEmoryCh	NM	NM	NM	NM

Table C-1(s). Sediment sample organotin data: San Diego Bay.

Sample#	Remarks	Total Solvent Extractable Tin (ngSn/g)
SD1-01-S-1	Adj.2buoy#8 Entr.Ch.	25.
SD1-01-S-2	Adj.2buoy#8 Entr.Ch.	UN
SD1-01-S-3	Adj.2buoy#8 Entr.Ch.	UN
SD1-02-S-1	NWfmbuoy#11BallastPt	ND
SD1-02-S-2	NWfmbuou#11BallastPt	ND
SD1-02-S-3	NWfmbuoy#11BallastPt	70.
SD1-03-S-1	SUBASE-BallstPtSPier	35.
SD1-03-S-2	SUBASE-BallstPtSPier	ND
SD1-03-S-3	SUBASE-BallstPtSPier	ND
SD1-04-S-1	SUBASE-NsideLongPier	28.
SD1-04-S-2	SUBASE-NsideLongPier	ND
SD1-04-S-3	SUBASE-NsideLongPier	ND
SD1-05-S-1	SUBASE-midwayNPiers	24.
SD1-05-S-2	SUBASE-midwayNPiers	ND
SD1-05-S-3	SUBASE-midwayNPiers	ND
SD1-06-S-1	offNoIs.adj2buoy#16A	18.
SD1-06-S-2	offNoIs.adj2buoy#16A	ND
SD1-06-S-3	offNoIs.adj2buoy#16A	ND
SD1-07-S-1	SWendShelterIsMkr#2	27.
SD1-07-S-2	SWendShelterIsMkr#2	ND
SD1-07-S-3	SWendShelterIsMkr#2	ND
SD1-08-S-1	ShelterIsMidChMkr#9	219.
SD1-08-S-2	ShelterIsMidChMkr#9	ND
SD1-08-S-3	ShelterIsMidChMkr#9	ND
SD1-09-S-1	ShltrIs.adjYachtClub	537.
SD1-09-S-2	ShltrIs.adjYachtClub	ND
SD1-09-S-3	ShltrIs.adjYachtClub	ND
SD1-10-S-1	Commercial Basin-NE	199.
SD1-10-S-2	Commercial Basin-NE	ND
SD1-10-S-3	Commercial Basin-NE	ND
SD1-11-S-1	Comm.Basin-adjChMkr2	239.
SD1-11-S-2	Comm.Basin-adjChMkr2	ND
SD1-11-S-3	Comm.Basin-adjChMkr2	ND
SD1-12-S-1	Comm.Basin-@Ket'berg	ND
SD1-12-S-2	Comm.Basin-@Ket'berg	746.
SD1-12-S-3	Comm.Basin-@Ket'berg	ND
SD1-13-S-1	Adj. to buoy #21	ND
SD1-13-S-2	Adj. to buoy #21	ND
SD1-13-S-3	Adj. to buoy #21	24.
SD1-14-S-1	Tuna Flt-midpier	ND
SD1-14-S-2	Tuna Flt-midpier	ND
SD1-14-S-3	Tuna Flt-midpier	32.
SD1-15-S-1	600m off CVA Pier-NI	48.
SD1-15-S-2	600m off CVA Pier-NI	ND
SD1-15-S-3	600m off CVA Pier-NI	ND
SD1-16-S-1	5thAveMarina-No.Basi	34.
SD1-16-S-2	5thAveMarina-3&4slip	49.
SD1-16-S-3	5thAveMarina-Entr.Ch	19.

Table C-1(s). Sediment sample organotin data: San Diego Bay (continued).

Sample#	Remarks	Total Solvent Extractable Tin (ngSn/g)
SD1-16-S-4	5thAveMarina-7&8slip	19.
SD1-17-S-1	CampbellShipydFlDDok	144.
SD1-17-S-2	CampbellShipydFlDDok	169.
SD1-17-S-3	CampbellShipydFlDDok	215.
SD1-18-S-1	CoronadoBrdge-Pier19	101.
SD1-18-S-2	CoronadoBrdge-Pier19	ND
SD1-18-S-3	CoronadoBrdge-Pier19	ND
SD1-19-S-1	Adj.NASSCOShydFlDDok	81.
SD1-19-S-2	Adj.NASSCOShydFlDDok	50.
SD1-19-S-3	Adj.NASSCOShydFlDDok	ND
SD1-20-S-1	NAVSTAequiPier2&quay	77.
SD1-20-S-2	NAVSTAequiPier2&quay	116.
SD1-20-S-3	NAVSTAequiPier2&quay	122.
SD1-21-S-1	200m off SsidePier#1	57.
SD1-21-S-2	200m off SsidePier#1	ND
SD1-21-S-3	200m off SsidePier#1	ND
SD1-22-S-1	NAVSTA @ end Pier #1	197.
SD1-22-S-2	NAVSTA @ end Pier #1	61.
SD1-22-S-3	NAVSTA @ end Pier #1	64.
SD1-23-S-1	Midch E of buoy #26	76.
SD1-23-S-2	Midch E of buoy #26	ND
SD1-23-S-3	Midch E of buoy #26	ND
SD1-24-S-1	Adj. to buoy #26	54.
SD1-24-S-2	Adj. to buoy #26	ND
SD1-24-S-3	Adj. to buoy #26	ND
SD1-25-S-1	~700mNE fm AmphbBase	UN
SD1-25-S-2	~700mNE fm AmphbBase	ND
SD1-25-S-3	~700mNE fm AmphbBase	ND
SD1-26-S-1	Adj.ChMkr#3AmphbBase	117.
SD1-26-S-2	Adj.ChMkr#3AmphbBase	77.
SD1-26-S-3	Adj.ChMkr#3AmphbBase	ND
SD1-27-S-1	NAVSTA SsidePier#3	190.
SD1-27-S-2	NAVSTA SsidePier#3	154.
SD1-27-S-3	NAVSTA SsidePier#3	131.
SD1-28-S-1	NAVSTA MidwyPiers4&5	142.
SD1-28-S-2	NAVSTA MidwyPiers4&5	100.
SD1-28-S-3	NAVSTA MidwyPiers4&5	95.
SD1-29-S-1	NAVSTAoffDDockPier#5	110.
SD1-29-S-2	NAVSTAoffDDockPier#5	67.
SD1-29-S-3	NAVSTAoffDDockPier#5	109.
SD1-30-S-1	NAVSTA SsideofPier#5	96.
SD1-30-S-2	NAVSTA SsideofPier#5	95.
SD1-30-S-3	NAVSTA SsideofPier#5	ND
SD1-31-S-1	NAVSTA end of Pier#5	ND
SD1-31-S-2	NAVSTA end of Pier#5	ND
SD1-31-S-3	NAVSTA end of Pier#5	ND
SD1-32-S-1	NAVSTA (MiddleRange)	82.
SD1-32-S-2	NAVSTA (MiddleRange)	ND

Table C-1(s). Sediment sample organotin data: San Diego Bay (continued).

Sample#	Remarks	Total Solvent Extractable Tin (ngSn/g)
SD1-32-S-3	NAVSTA (MiddleRange)	ND
SD1-33-S-1	NAVSTA (MiddleRange)	150.
SD1-33-S-2	NAVSTA (MiddleRange)	ND
SD1-33-S-3	NAVSTA (MiddleRange)	ND
SD1-34-S-1	NAVSTA (MiddleRange)	UN
SD1-34-S-2	NAVSTA (MiddleRange)	ND
SD1-34-S-3	NAVSTA (MiddleRange)	ND
SD1-35-S-1	NAVSTA (MiddleRange)	UN
SD1-35-S-2	NAVSTA (MiddleRange)	ND
SD1-35-S-3	NAVSTA (MiddleRange)	ND
SD1-36-S-1	NAVSTA(MidRange)SStd	UN
SD1-36-S-2	NAVSTA(MidRange)SStd	ND
SD1-36-S-3	NAVSTA(MidRange)SStd	ND
SD1-37-S-1	NAVSTA betwnPiers6&7	33.
SD1-37-S-2	NAVSTA betwnPiers6&7	ND
SD1-37-S-3	NAVSTA betwnPiers6&7	ND
SD1-38-S-1	NAVSTA Nside Pier #8	77.
SD1-38-S-2	NAVSTA Nside Pier #8	ND
SD1-38-S-3	NAVSTA Nside Pier #8	ND
SD1-39-S-1	NAVSTASRngeNSideMole	83.
SD1-39-S-2	NAVSTASRngeNSideMole	ND
SD1-39-S-3	NAVSTASRngeNSideMole	ND
SD1-40-S-1	NAVSTASRngePier11&12	22.
SD1-40-S-2	NAVSTASRngePier11&12	ND
SD1-40-S-3	NAVSTASRngePier11&12	ND
SD1-41-S-1	NAVSTA end of Pier13	UN
SD1-41-S-2	NAVSTA end of Pier13	ND
SD1-41-S-3	NAVSTA end of Pier13	ND
SD1-42-S-1	NAVSTA Adj buoy #34	UN
SD1-42-S-2	NAVSTA Adj buoy #34	ND
SD1-42-S-3	NAVSTA Adj buoy #34	ND
SD1-43-S-1	NAVSTA SRnge midbay	UN
SD1-43-S-2	NAVSTA SRnge midbay	ND
SD1-43-S-3	NAVSTA SRnge midbay	ND
SD1-44-S-1	NAVSTA SRnge (W end)	UN
SD1-44-S-2	NAVSTA SRnge (W end)	ND
SD1-44-S-3	NAVSTA SRnge (W end)	ND
SD1-45-S-1	Adj to buoy #41 SBay	UN
SD1-45-S-2	Adj to buoy #41 SBay	ND
SD1-45-S-3	Adj to buoy #41 SBay	ND
SD1-46-S-1	Adj to ChMkr#1-CVSBB	UN
SD1-46-S-2	Adj to ChMkr#1-CVSBB	ND
SD1-46-S-3	Adj to ChMkr#1-CVSBB	ND
SD1-47-S-1	80mEofCCaysChMkr#15	UN
SD1-47-S-2	80mEofCCaysChMkr#15	ND
SD1-47-S-3	80mEofCCaysChMkr#15	ND
SD1-48-S-1	NWofSDG&Elevee(SBay)	UN
SD1-48-S-2	NWofSDG&Elevee(SBay)	ND

Table C-1(s). Sediment sample organotin data: San Diego Bay (continued).

Sample#	Remarks	Total Solvent Extractable Tin (ngSn/g)
SD1-48-S-3	NWofSDG&Elevee(SBay)	ND
SD1-49-S-1	IntakeChtoSDG&EPlant	UN
SD1-49-S-2	IntakeChtoSDG&EPlant	ND
SD1-49-S-3	IntakeChtoSDG&EPlant	ND
SD1-50-S-1	DChrgeChofSDG&EPlant	UN
SD1-50-S-2	DChrgeChofSDG&EPlant	ND
SD1-50-S-3	DChrgeChofSDG&EPlant	ND
SD1-51-S-1	OfftipofSDG&E levee	UN
SD1-51-S-2	OfftipofSDG&E levee	ND
SD1-51-S-3	OfftipofSDG&E levee	ND
SD1-52-S-1	SoSDBay-nearEmoryCh	UN
SD1-52-S-2	SoSDBay-nearEmoryCh	ND
SD1-52-S-3	SoSDBay-nearEmoryCh	ND

Table C-1(t). Tissue sample organotin data: San Diego Bay.

Sample#	Remarks	Total Solvent Extractable Tin (ugSn/g dry/wet wt)	n =	Mean length
SD1-02B-T-1	DegausRnge-2ndpiling	0.34 / 0.054	5	53.80
SD1-02B-T-2	DegausRnge-2ndpiling	0.38 / 0.061	5	50.60
SD1-02B-T-3	DegausRnge-2ndpiling	0.21 / 0.034	5	56.80
SD1-02B-T-4	DegausRnge-2ndpiling	0.39 / 0.062	5	58.80
SD1-02B-T-5	DegausRnge-2ndpiling	0.49 / 0.078	5	49.60
SD1-04-T-1	SUBASE-Nsidelongpier	1.01 / 0.162	5	61.00
SD1-04-T-2	SUBASE-Nsidelongpier	0.85 / 0.136	5	58.20
SD1-04-T-3	SUBASE-Nsidelongpier	1.13 / 0.181	5	56.80
SD1-04-T-4	SUBASE-Nsidelongpier	0.69 / 0.110	5	59.20
SD1-04-T-5	SUBASE-Nsidelongpier	0.74 / 0.118	5	63.60
SD1-04A-T-1	SUBASE-off S dolphin	1.05 / 0.168	5	45.20
SD1-04A-T-2	SUBASE-off S dolphin	0.78 / 0.125	5	43.60
SD1-04A-T-3	SUBASE-off S dolphin	0.93 / 0.149	5	47.20
SD1-04A-T-4	SUBASE-off S dolphin	0.98 / 0.157	5	44.20
SD1-04A-T-5	SUBASE-off S dolphin	0.86 / 0.138	5	43.60
SD1-06-T-1	Sta 6A-No.Is.S pier	0.79 / 0.126	5	56.80
SD1-06-T-2	Sta 6A-No.Is.S pier	0.86 / 0.138	5	59.40
SD1-06-T-3	Sta 6A-No.Is.S pier	0.79 / 0.126	5	56.80
SD1-06-T-4	Sta 6A-No.Is.S pier	0.66 / 0.106	5	60.60
SD1-06-T-5	Sta 6A-No.Is.S pier	0.91 / 0.146	5	63.20
SD1-07-T-1	EntrShelterIsMarina	2.14 / 0.342	9	41.20
SD1-07-T-2	EntrShelterIsMarina	1.99 / 0.318	9	39.80
SD1-07-T-3	EntrShelterIsMarina	2.05 / 0.328	9	41.00
SD1-07A-T-4	UnderSIO pier-middle	2.07 / 0.331	5	51.80
SD1-07A-T-5	UnderSIO pier-middle	3.40 / 0.544	5	52.40
SD1-10-T-1	CommBasin-@BaliHaidk	4.68 / 0.749	9	43.10
SD1-10-T-2	CommBasin-@BaliHaidk	4.50 / 0.720	9	40.70
SD1-10-T-3	CommBasin-@BaliHaidk	4.86 / 0.778	9	42.60
SD1-10-T-4	CommBasin-@BaliHaidk	4.72 / 0.755	9	39.70
SD1-10-T-5	CommBasin-@BaliHaidk	4.24 / 0.678	9	41.60
SD1-10B-T-1	UnderNTCbridge-centr	4.57 / 0.731	5	58.00
SD1-10B-T-2	UnderNTCbridge-centr	4.65 / 0.744	5	52.00
SD1-10B-T-3	UnderNTCbridge-centr	3.59 / 0.574	5	49.60
SD1-10B-T-4	UnderNTCbridge-centr	5.61 / 0.898	5	52.20
SD1-10B-T-5	UnderNTCbridge-centr	5.12 / 0.819	5	49.00
SD1-14-T-1	Tuna Fleet-Mid Pier	1.71 / 0.274	5	61.60
SD1-14-T-2	Tuna Fleet-Mid Pier	1.62 / 0.259	5	55.40
SD1-14-T-3	Tuna Fleet-Mid Pier	1.64 / 0.262	5	54.40
SD1-14-T-4	Tuna Fleet-Mid Pier	2.60 / 0.416	5	63.60
SD1-14-T-5	Tuna Fleet-Mid Pier	1.55 / 0.248	5	56.80
SD1-15-T-1	CrzrPier-Sm.boatLndg	1.52 / 0.243	5	52.40
SD1-15-T-2	CrzrPier-Sm.boatLndg	1.40 / 0.224	5	53.60
SD1-15-T-3	CrzrPier-Sm.boatLndg	1.70 / 0.272	5	52.20
SD1-15-T-4	CrzrPier-Sm.boatLndg	1.48 / 0.237	5	50.20
SD1-15-T-5	CrzrPier-Sm.boatLndg	1.60 / 0.256	5	55.50

Table C-1(t). Tissue sample organotin data: San Diego Bay (continued).

Sample#	Remarks	Total Solvent Extractable Tin (ugSn/g dry/wet wt)	n =	Mean length
SD1-18-T-1	CoronadoBrdge-Pier19	1.40 / 0.224	5	55.40
SD1-18-T-2	CoronadoBrdge-Pier19	2.37 / 0.379	5	54.00
SD1-18-T-3	CoronadoBrdge-Pier19	1.78 / 0.285	5	55.40
SD1-18-T-4	CoronadoBrdge-Pier19	1.77 / 0.283	5	60.40
SD1-18-T-5	CoronadoBrdge-Pier19	1.83 / 0.293	5	53.80
SD1-19-T-1	Adj.NASSCOShpydFlDDk	1.61 / 0.258	5	50.00
SD1-19-T-2	Adj.NASSCOShpydFlDDk	1.73 / 0.277	5	53.00
SD1-19-T-3	Adj.NASSCOShpydFlDDk	1.32 / 0.211	5	52.80
SD1-19-T-4	Adj.NASSCOShpydFlDDk	1.77 / 0.283	5	52.80
SD1-19-T-5	Adj.NASSCOShpydFlDDk	1.74 / 0.278	5	54.60
SD1-22-T-1	NAVSTA @ end Pier #1	1.85 / 0.296	5	50.20
SD1-22-T-2	NAVSTA @ end Pier #1	3.00 / 0.480	5	48.40
SD1-22-T-3	NAVSTA @ end Pier #1	2.01 / 0.322	5	47.20
SD1-22-T-4	NAVSTA @ end Pier #1	2.38 / 0.381	5	51.60
SD1-22-T-5	NAVSTA @ end Pier #1	2.01 / 0.322	5	56.20
SD1-26-T-1	fmpiling@ChMkr#3ABse	1.36 / 0.218	10	43.40
SD1-26-T-2	fmpiling@ChMkr#3ABse	1.63 / 0.261	10	40.10
SD1-26-T-3	fmpiling@ChMkr#3ABse	1.58 / 0.253	10	41.70
SD1-26-T-4	fmpiling@ChMkr#3ABse	1.44 / 0.230	10	41.70
SD1-26-T-5	fmpiling@ChMkr#3ABse	1.49 / 0.238	10	43.30
SD1-38A-T-1	NAVSTA@end of Pier#8	2.20 / 0.352	5	47.60
SD1-38A-T-2	NAVSTA@end of Pier#8	1.98 / 0.317	5	50.20
SD1-38A-T-3	NAVSTA@end of Pier#8	1.75 / 0.280	5	54.20
SD1-38A-T-4	NAVSTA@end of Pier#8	1.68 / 0.269	5	47.60
SD1-38A-T-5	NAVSTA@end of Pier#8	1.92 / 0.307	5	45.80
SD1-44A-T-1	CornadoCays@NChMkr#2	1.30 / 0.208	5	50.40
SD1-44A-T-2	CornadoCays@NChMkr#2	1.54 / 0.246	5	58.40
SD1-44A-T-3	CornadoCays@NChMkr#2	0.81 / 0.130	5	43.60
SD1-44A-T-4	CornadoCays@NChMkr#2	0.82 / 0.131	5	57.60
SD1-44A-T-5	CornadoCays@NChMkr#2	0.89 / 0.142	5	58.00
SD1-48A-T-1	CrndoCays@SoChMkr#22	1.52 / 0.243	5	45.00
SD1-48A-T-2	CrndoCays@SoChMkr#22	2.10 / 0.336	5	57.20
SD1-48A-T-3	CrndoCays@SoChMkr#22	1.40 / 0.224	5	59.40
SD1-48A-T-4	CrndoCays@SoChMkr#22	1.48 / 0.237	5	56.80
SD1-48A-T-5	CrndoCays@SoChMkr#22	1.11 / 0.178	5	56.80
SD1-49A-T-1	ChulaVistaSmBBsnPier	2.46 / 0.394	5	55.60
SD1-49A-T-2	ChulaVistaSmBBsnPier	2.22 / 0.355	5	57.00
SD1-49A-T-3	ChulaVistaSmBBsnPier	1.78 / 0.285	5	57.40
SD1-49A-T-4	ChulaVistaSmBBsnPier	1.87 / 0.299	5	56.20
SD1-49A-T-5	ChulaVistaSmBBsnPier	2.70 / 0.432	5	53.40

Table C-2(w). Water sample organotin data: LA/Long Beach Harbor.

Sample#	Remarks	BuSn	Bu2Sn	Bu3Sn	Total Butyltin (ug/L)
LB-01-W-1	25mSEoLBeachHorn-EntCh	UN	UN	UN	UN
LB-01-W-2	25mSEoLBeachHorn-EntCh	UN	UN	UN	UN
LB-01-W-3	25mSEoLBeachHorn-EntCh	NM	NM	UN	NM
LB-02-W-1	MdwybtwnPierJ&Brkwater	UN	NM	UN	NM
LB-03-W-1	30mSofEsidePierG-SEbsn	0.005	0.005	0.012	0.022
LB-04-W-1	15moffendofNavyMoleCtr	0.004	0.004	UN	0.008
LB-05-W-1	15moffCaissontoDryDk#1	0.006	NM	UN	0.006
LB-05-W-2	15moffCaissontoDryDk#1	0.005	0.004	UN	0.009
LB-05-W-3	15moffCaissontoDryDk#1	0.006	NM	UN	0.006
LB-06-W-1	20mEofPier#2-LBNShipYd	0.005	0.006	NM	0.011
LB-07-W-1	100moffDDk#3-20mWPier3	0.004	0.007	NM	0.011
LB-08-W-1	150moffEendNavyYchtClb	0.004	0.004	NM	0.008
LB-08-W-2	150moffEendNavyYchtClb	0.004	0.006	NM	0.010
LB-08-W-3	150moffEendNavyYchtClb	*	*	*	*
LB-08A-W-1	AlongShrline@NavyYchCb	0.004	0.012	0.019	0.035
LB-08A-W-2	AlongShrline@NavyYchCb	0.006	0.016	*	0.022
LB-08A-W-3	AlongShrline@NavyYchCb	0.004	0.017	0.024	0.045
LB-09-W-1	MdwyBtwnSIMApiers15&16	NM	0.003	UN	0.003
LB-10-W-1	AdjtoInnerHarborMarina	*	0.020	0.027	0.047
LB-10-W-2	AdjtoInnerHarborMarina	0.016	0.024	0.019	0.059
LB-10-W-3	AdjtoInnerHarborMarina	0.020	0.025	0.027	0.072
LB-11-W-1	30moffNsideTrngBas@Tex	0.014	0.010	0.005	0.029
LB-12-W-1	AdjMarinaSsideCerritos	0.011	0.015	0.015	0.041
LB-12-W-2	AdjMarinaSsideCerritos	0.010	0.019	0.014	0.043
LB-12-W-3	AdjMarinaSsideCerritos	0.012	0.012	0.016	0.040
LB-13-W-1	AdjEastBsnMarinaCertCh	0.015	0.011	0.023	0.049
LB-14-W-1	AdjToddShpBldgFlDryDck	0.008	0.020	0.022	0.050
LB-14-W-2	AdjToddShpBldgFlDryDck	-	-	-	LOST
LB-14-W-3	AdjToddShpBldgFlDryDck	0.010	0.024	0.023	0.049
LB-15-W-1	AdjSWMarinePiersDryDck	0.013	0.032	0.015	0.060
LB-15A-W-1	AlongShlineEendNWSMari	UN	UN	UN	UN
LB-16-W-1	30mNWofEJettytoMainChl	UN	UN	UN	UN
LB-16-W-2	30mNWofEJettytoMainChl	UN	UN	UN	UN
LB-16-W-3	30mNWofEJettytoMainChl	UN	UN	UN	UN
LB-17-W-1	50mNWofRecFshg"AnnieB"	-	-	-	LOST
LB-17-W-2	50mNWofRecFshg"AnnieB"	UN	NM	UN	NM
LB-17-W-3	50mNWofRecFshg"AnnieB"	-	-	-	LOST
LB-18-W-1	CtrLBchShorelineMarina	0.054	0.099	0.110	0.263
LB-18-W-2	CtrLBchShorelineMarina	0.043	0.096	0.095	0.234
LB-18-W-3	CtrLBchShorelineMarina	0.054	0.112	0.119	0.285
LB-18A-W-1	@Ent2LBShorelineMarina	NM	0.013	NM	0.013

Table C-3(w). Water sample organotin data: San Francisco Bay.

Sample#	Remarks	BuSn	Bu2Sn	Bu3Sn	Total Butyltin (ug/L)
SF-01-W-1	NAS AlamedaPtSerBoaths	UN	UN	UN	UN
SF-01-W-2	NAS AlamedaPtSerBoaths	UN	NM	UN	NM
SF-01-W-3	NAS AlamedaPtSerBoaths	UN	UN	UN	UN
SF-02-W-1	AdjPacDryDk&RepairEsty	0.039	0.032	0.090	0.161
SF-02-W-2	AdjPacDryDk&RepairEsty	0.051	0.037	0.139	0.227
SF-02-W-3	AdjPacDryDk&RepairEsty	0.071	0.076	0.158	0.305
SF-03-W-1	AdjUSCGpierSEendGovtIs	0.007	UN	0.012	0.019
SF-04-W-1	CntrFortmanBasinMarina	0.022	0.011	0.019	0.052
SF-04-W-2	CntrFortmanBasinMarina	0.012	0.004	0.024	0.040
SF-04-W-3	CntrFortmanBasinMarina	0.021	0.003	0.050	0.074
SF-05-W-1	AdjUSCGWHECpierAlEstry	UN	UN	0.010	0.010
SF-06-W-1	Nend NSC OaklandPier#4	UN	UN	UN	UN
SF-07-W-1	NEendOaklndOuterHarbor	UN	UN	UN	UN
SF-07-W-2	NEendOaklndOuterHarbor	UN	UN	UN	UN
SF-07-W-3	NEendOaklndOuterHarbor	UN	UN	UN	UN
SF-08-W-1	@MatsnPiersOkldOutrHbr	UN	UN	UN	UN
SF-09-W-1	NAS AlamedaendCVpier#3	UN	NM	UN	NM
SF-10-W-1	CenterEmeryvilleMarina	UN	UN	UN	UN
SF-10-W-2	CenterEmeryvilleMarina	UN	UN	UN	UN
SF-10-W-3	CenterEmeryvilleMarina	UN	UN	UN	UN
SF-11-W-1	offNE T-piersTreasIsld	UN	UN	UN	UN
SF-12-W-1	EsideTreasIsoffnewpier	0.004	NM	UN	0.004
SF-13-W-1	@USCDpier-YerbaBuenaIs	NM	NM	NM	NM
SF-13-W-2	@USCDpier-YerbaBuenaIs	UN	UN	UN	UN
SF-13-W-3	@USCDpier-YerbaBuenaIs	NM	NM	UN	NM
SF-14-W-1	offNWsideCtrPileBayBrg	UN	UN	UN	UN
SF-15-W-1	CtrFishrmn'sWhrfadj#45	NM	NM	UN	NM
SF-15-W-2	CtrFishrmn'sWhrfadj#45	UN	NM	UN	NM
SF-15-W-3	CtrFishrmn'sWhrfadj#45	UN	NM	UN	NM
SF-16-W-1	offNEtipPier '29SanFran	UN	UN	UN	UN
SF-17-W-1	CenterSFBay~2500mSofYB	UN	UN	UN	UN
SF-17-W-2	CenterSFBay~2500mSofYB	UN	UN	UN	UN
SF-17-W-3	CenterSFBay~2500mSofYB	UN	UN	UN	UN
SF-18-W-1	@NAS Alameda Ch Mkr #3	UN	UN	UN	UN
SF-18-W-2	@NAS Alameda Ch Mkr #3	UN	UN	UN	UN
SF-18-W-3	@NAS Alameda Ch Mkr #3	UN	UN	UN	UN

Table C-4(w). Water sample organotin data: Mare Island Strait.

Sample#	Remarks	BuSn:ppb	Bu2Sn:ppb	Bu3Sn:ppb	Total Butyltin (ug/L)
MI-01-W-1	EntrChBtwnDikes#9&14	UN	UN	UN	UN
MI-01-W-2	EntrChBtwnDikes#9&14	UN	UN	UN	UN
MI-01-W-3	EntrChBtwnDikes#9&14	UN	UN	UN	UN
MI-02-W-1	100mEofPier#34USCoGd	UN	UN	UN	UN
MI-03-W-1	150mWofSoVallejoTwr	UN	UN	UN	UN
MI-04-W-1	100moffSouthQuaywall	UN	UN	UN	UN
MI-05-W-1	20moffPier#22/SBU-11	UN	UN	UN	UN
MI-06-W-1	150mWofOilRigConstr	UN	UN	NM	NM
MI-06-W-2	150mWofOilRigConstr	ND	ND	ND	ND
MI-06-W-3	150mWofOilRigConstr	ND	ND	ND	ND
MI-07-W-1	50mEofDryDock#4Caisn	UN	UN	UN	UN
MI-07-W-2	50mEofDryDock#4Caisn	UN	UN	UN	UN
MI-07-W-3	50mEofDryDock#4Caisn	UN	UN	NM	NM
MI-08-W-1	25mSEofDryDock#3Cais	UN	UN	UN	UN
MI-09-W-1	50moffquay@DryDock#3	UN	UN	UN	UN
MI-10-W-1	50mWofMIferryslp-Vjo	UN	NM	UN	NM
MI-10-W-2	50mWofMIferryslp-Vjo	UN	NM	UN	NM
MI-10-W-3	50mWofMIferryslp-Vjo	UN	NM	UN	NM
MI-11-W-1	20mWofMIferryslp-MIs	UN	UN	UN	UN
MI-12-W-1	VallejoYachtClub-ctr	NM	NM	0.036	0.036
MI-12-W-2	VallejoYachtClub-ctr	NM	NM	0.034	0.034
MI-12-W-3	VallejoYachtClub-ctr	NM	NM	0.046	0.046
MI-13-W-1	50m off USS Nautilus	UN	UN	UN	UN
MI-14-W-1	VallejoMarinaSoEntr.	UN	UN	UN	UN
MI-15-W-1	VallejoMarina-No.End	UN	UN	UN	UN
MI-15-W-2	VallejoMarina-No.End	UN	UN	UN	UN
MI-15-W-3	VallejoMarina-No.End	UN	UN	UN	UN
MI-16-W-1	VallejoMarinaNoEntr.	UN	UN	UN	UN
MI-17-W-1	Mare Island Causeway	UN	UN	UN	UN
MI-18-W-1	NapaRiverBridge-Cntr	UN	UN	UN	UN
MI-18-W-2	NapaRiverBridge-Cntr	UN	UN	UN	UN
MI-18-W-3	NapaRiverBridge-Cntr	UN	UN	UN	UN

Table C-4(s). Sediment sample organotin data: Mare Island Strait.

Sample#	Remarks	Total Solvent Extractable Tin (ngSn/g)
MI-01-S-1	EntrChBtwnDikes#9&14	11.25
MI-01-S-2	EntrChBtwnDikes#9&14	11.74
MI-01-S-3	EntrChBtwnDikes#9&14	5.9
MI-02-S-1	100mEPier#34USCOGARD	2.00
MI-02-S-2	100mEPier#34USCOGARD	2.55
MI-02-S-3	100mEPier#34USCOGARD	3.08
MI-03-S-1	100mWofS.VallejoTwr	2.32
MI-03-S-2	100mWofS.VallejoTwr	ND
MI-03-S-3	100mWofS.VallejoTwr	ND
MI-04-S-1	100moff So. quaywall	3.24
MI-04-S-2	100moff So. quaywall	4.41
MI-04-S-3	100moff So. quaywall	4.07
MI-05-S-1	20moffPier#22 SBU-11	7.74
MI-05-S-2	20moffPier#22 SBU-11	ND
MI-05-S-3	20moffPier#22 SBU-11	ND
MI-06-S-1	150mWOilRig-Vajoside	8.33
MI-06-S-2	150mWOilRig-Vajoside	3.84
MI-06-S-3	150mWOilRig-Vajoside	2.50
MI-07-S-1	50mEDryDock#4Caisson	3.96
MI-07-S-2	50mEDryDock#4Caisson	ND
MI-07-S-3	50mEDryDock#4Caisson	ND
MI-08-S-1	25mSEDryDock#3Caisso	4.33
MI-08-S-2	25mSEDryDock#3Caisso	5.87
MI-08-S-3	25mSEDryDock#3Caisso	5.71
MI-09-S-1	50moffquayadjDryDk#2	2.10
MI-09-S-2	50moffquayadjDryDk#2	ND
MI-09-S-3	50moffquayadjDryDk#2	ND
MI-10-S-1	50mW MIFerrySlpEside	3.29
MI-10-S-2	50mW MIFerrySlpEside	ND
MI-10-S-3	50mW MIFerrySlpEside	ND
MI-11-S-1	20mWMIFerryDkMIsSide	2.47
MI-11-S-2	20mWMIFerryDkMIsSide	ND
MI-11-S-3	20mWMIFerryDkMIsSide	ND
MI-12-S-1	VallejoYachtClub-Mid	5.37
MI-12-S-2	VallejoYachtClub-Mid	4.47
MI-12-S-3	VallejoYachtClub-Mid	15.75
MI-13-S-1	50moffUSSNautilus	4.28
MI-13-S-2	50moffUSSNautilus	ND
MI-13-S-3	50moffUSSNautilus	ND
MI-14-S-1	VallejoMarinaSoEntr	1.65
MI-14-S-2	VallejoMarinaSoEntr	ND
MI-14-S-3	VallejoMarinaSoEntr	ND
MI-15-S-1	VallejoMarinaNoEnd	2.76
MI-15-S-2	VallejoMarinaNoEnd	2.58
MI-15-S-3	VallejoMarinaNoEnd	3.04
MI-16-S-1	VallejoMarinaNoEntr	2.01
MI-16-S-2	VallejoMarinaNoEntr	ND
MI-16-S-3	VallejoMarinaNoEntr	ND

Table C-4(s). Sediment sample organotin data: Mare Island Strait (continued).

Sample#	Remarks	Total Solvent Extractable Tin (ngSn/g)
MI-17-S-1	MareIsCausewayCntrPr	UN
MI-17-S-2	MareIsCausewayCntrPr	ND
MI-17-S-3	MareIsCausewayCntrPr	ND
MI-18-S-1	Napa River BridgeCtr	UN
MI-18-S-2	Napa River BridgeCtr	UN
MI-18-S-3	Napa River BridgeCtr	UN

Table C-5(w). Water sample organotin data: Bremerton.

Sample#	Remarks	BuSn	Bu2Sn	Bu3Sn	Total Butyltin (ug/L)
BR-01-W-1	50mSofMkr#12offPtHeron	UN	NM	NM	NM
BR-01-W-2	50mSofMkr#12offPtHeron	UN	NM	UN	NM
BR-01-W-3	50mSofMkr#12offPtHeron	UN	UN	UN	UN
BR-02-W-1	20mEofBremrtnFerrySlip	NM	NM	0.002	0.002
BR-02-W-2	20mEofBremrtnFerrySlip	UN	NM	0.002	0.002
BR-02-W-3	20mEofBremrtnFerrySlip	NM	NM	0.004	0.004
BR-03-W-1	MidChbtwnBrem&PortOrcd	NM	NM	NM	NM
BR-04-W-1	15mNWofRA TargetNWof#3	*	*	*	*
BR-04-W-2	15mNWofRA TargetNWof#3	*	*	*	*
BR-04-W-3	15mNWofRA TargetNWof#3	*	*	*	*
BR-05-W-1	CtrofPortOrchardMarina	0.002	0.005	0.004	0.011
BR-05-W-2	CtrofPortOrchardMarina	*	0.002	*	*
BR-05-W-3	CtrofPortOrchardMarina	0.005	NM	0.009	0.014
BR-06-W-1	CtrPortOrchardYachtClb	UN	0.005	0.017	0.022
BR-07-W-1	500mNNWOrchardYachtClb	UN	UN	UN	UN
BR-08-W-1	200mWNWSheltonIsBoatWx	UN	UN	UN	UN
BR-09-W-1	CenterSheltonIsBoatWrx	UN	UN	UN	UN
BR-09-W-2	CenterSheltonIsBoatWrx	UN	UN	UN	UN
BR-09-W-3	CenterSheltonIsBoatWrx	*	*	*	*
BR-10-W-1	@Epilings@BremertonSTP	UN	UN	UN	UN
BR-10-W-2	@Epilings@BremertonSTP	UN	UN	UN	UN
BR-10-W-3	@Epilings@BremertonSTP	UN	UN	UN	UN
BR-11-W-1	10masternofAFDMInacShp	UN	UN	UN	UN
BR-12-W-1	10moffDryDk#6w/[LHA-3]	*	*	*	*
BR-13-W-1	10moffDryDk#5[midpier]	UN	UN	UN	UN
BR-14-W-1	100mWestofPier#4PSNSYD	UN	UN	UN	UN
BR-15-W-1	10moffcaissonofDryDk#2	*	*	*	*
BR-15-W-2	10moffcaissonofDryDk#2	*	*	*	*
BR-15-W-3	10moffcaissonofDryDk#2	*	*	*	*
BR-16-W-1	MdwybtwnPiers#5&6PSNSY	UN	UN	UN	UN
BR-17-W-1	10moffcaissontoDryDk#1	UN	UN	UN	UN
BR-18-W-1	10moffEastPierstoPSNSY	UN	UN	UN	UN

Table C-6(w). Water sample organotin data: Pearl Harbo..

Sample#	Remarks	BuSn	Bu2Sn	Bu3Sn	Total Butyltin (ug/L)
PH1-01-W-1	EntrCh100mWofSubNetP	0.017	UN	UN	0.017
PH1-02-W-1	NofAbndFerrySlpFtKam	0.030	UN	UN	0.030
PH1-03-W-1	100w of Bishop Point	UN	UN	NM	NM
PH1-04-W-1	100mSW of Waipio Pt	UN	UN	NM	NM
PH1-05-W-1	100mSWChMkr#16HospPt	UN	UN	UN	UN
PH1-05-W-2	100mSWChMkr#16HospPt	UN	UN	NM	NM
PH1-05-W-3	100mSWChMkr#16HospPt	UN	UN	NM	NM
PH1-06-W-1	150mSWNOSCucosmFordI	UN	UN	NM	NM
PH1-07-W-1	50mNEDryDock#2PHNSYD	UN	UN	UN	UN
PH1-08-W-1	20mWofPier#B-2PHNSYD	UN	UN	UN	UN
PH1-09-W-1	30moffNEend1010Dock	UN	UN	UN	UN
PH1-09-W-2	30moffNEend1010Dock	UN	UN	UN	UN
PH1-09-W-3	30moffNEend1010Dock	UN	UN	UN	UN
PH1-10-W-1	25moffNendPierB-22	UN	UN	UN	UN
PH1-11-W-1	@MerryPt25moffM2-M3	UN	UN	UN	UN
PH1-12-W-1	100mSWofSubaseAFDM	UN	UN	UN	UN
PH1-13-W-1	30mSWNavSupCen #K-8	UN	UN	UN	UN
PH1-14-W-1	RainbowMarine1stSSlP	UN	UN	UN	UN
PH1-14-W-2	RainbowMarina1stSSlp	UN	UN	UN	UN
PH1-14-W-3	RainbowMarina1stSSlp	UN	UN	UN	UN
PH1-15-W-1	30mSWBuoy#25(NEFordI	NM	NM	NM	NM
PH1-15-W-2	30mSWBuoy#25(NEFordI	NM	NM	NM	NM
PH1-15-W-3	30mSwBuoy#25(NEFordI	NM	NM	NM	NM
PH1-16-W-1	@endHECoSheetPiling	UN	UN	UN	UN
PH1-16-W-2	@endHECoSheetPiling	UN	UN	UN	UN
PH1-16-W-3	@endHECoSheetPiling	UN	UN	UN	UN
PH1-16A-W-1	HECoWaiau in dischge	UN	UN	UN	UN
PH1-16A-W-2	HECoWaiau in dischge	UN	UN	UN	UN
PH1-17-W-1	50moffPiersF-12/F-13	NM	NM	NM	NM
PH1-18-W-1	50moffPiersV-2/V-3Pt	UN	UN	UN	UN
PH1-19-W-1	MiddleLochInActShpMn	NM	NM	UN	NM
PH1-20-W-1	SWendFordIsAdjBuoy36	UN	UN	UN	UN
PH1-20-W-2	SWendFordIsAdjBuoy36	UN	UN	UN	UN
PH1-20-W-3	SWendFordIsAdjBuoy36	UN	UN	UN	UN

Table C-6(s). Sediment sample organotin data: Pearl Harbor.

Sample#	Remarks	Total Solvent Extractable Tin (ngSn/g)
PH1-01-S-1	EntrCh100mWofSubNetP	UN
PH1-01-S-2	EntrCh100mWofSubNetP	ND
PH1-01-S-3	EntrCh100mWofSubNetP	ND
PH1-02-S-1	NofAbndFerrySlpFtKam	UN
PH1-02-S-2	NofAbndFerrySlpFtKam	ND
PH1-02-S-3	NofAbndFerrySlpFtKam	ND
PH1-03-S-1	100w of Bishop Point	UN
PH1-03-S-2	100w of Bishop Point	ND
PH1-03-S-3	100w of Bishop Point	ND
PH1-04-S-1	100mSW of Waipio Pt	UN
PH1-04-S-2	100mSW of Waipio Pt	ND
PH1-04-S-3	100mSW of Waipio Pt	ND
PH1-05-S-1	100mSWChMkr#16HospPt	UN
PH1-05-S-2	100mSWChMkr#16HospPt	ND
PH1-05-S-3	100mSWChMkr#16HospPt	ND
PH1-06-S-1	150mSWNOSCucosmFordI	UN
PH1-06-S-2	150mSWNOSCucosmFordI	ND
PH1-06-S-3	150mSWNOSCucosmFordI	ND
PH1-07-S-1	50mNEDryDock#2PHNSYD	UN
PH1-07-S-2	50mNEDryDock#2PHNSYD	ND
PH1-07-S-3	50mNEDryDock#2PHNSYD	ND
PH1-08-S-1	20mWofPier#B-2PHNSYD	UN
PH1-08-S-2	20mWofPier#B-2PHNSYD	ND
PH1-08-S-3	20mWofPier#B-2PHNSYD	ND
PH1-09-S-1	30moffNEend1010Dock	UN
PH1-09-S-2	30moffNEend1010Dock	ND
PH1-09-S-3	30moffNEend1010Dock	ND
PH1-10-S-1	25moffNendPierB-22	UN
PH1-10-S-2	25moffNendPierB-22	ND
PH1-10-S-3	25moffNendPierB-22	ND
PH1-11-S-1	@MerryPt25moffM2-M3	UN
PH1-11-S-2	@MerryPt25moffM2-M3	ND
PH1-11-S-3	@MerryPt25moffM2-M3	ND
PH1-12-S-1	100mSWofSubaseAFDM	51.11
PH1-12-S-2	100mSWofSubaseAFDM	ND
PH1-12-S-3	100mSWofSubaseAFDM	ND
PH1-13-S-1	30mSWNavSupCen #K-8	16.18
PH1-13-S-2	30mSWNavSupCen #K-8	ND
PH1-13-S-3	30mSWNavSupCen #K-8	ND
PH1-14-S-1	RainbowMarina1stSlip	UN
PH1-14-S-2	RainbowMarina1stSlip	ND
PH1-14-S-3	RainbowMarina1stSlip	ND
PH1-15-S-1	30mSWBuoy#25NEFordIs	UN
PH1-15-S-2	30mSWBuoy#25NEFordIs	ND
PH1-15-S-3	30mSWBuoy#25NEFordIs	ND
PH1-16-S-1	@endHECoSheetPiling	UN
PH1-16-S-2	@endHECoSheetPiling	ND
PH1-16-S-3	@endHECoSheetPiling	ND

Table C-6(s). Sediment sample organotin data: Pearl Harbor (continued).

Sample#	Remarks	Total Solvent Extractable Tin (ngSn/g)
PH1-17-S-1	50moffPiersF-12/F-13	UN
PH1-17-S-2	50moffPiersF-12/F-13	ND
PH1-17-S-3	50moffPiersF-12/F-13	ND
PH1-18-S-1	50moffPiersV-2/V-3Pt	UN
PH1-18-S-2	50moffPiersV-2/V-3Pt	ND
PH1-18-S-3	50moffPiersV-2/V-3Pt	ND
PH1-19-S-1	MiddleLochInActShpMn	UN
PH1-19-S-2	MiddleLochInActShpMn	ND
PH1-19-S-3	MiddleLochInActShpMn	ND
PH1-20-S-1	SWendFordIsAdjBuoy36	UN
PH1-20-S-2	SWendFordIsAdjBuoy36	ND
PH1-20-S-3	SWendFordIsAdjBuoy36	ND

Table C-6(t). Tissue sample organotin data: Pearl Harbor.

Sample#	Remarks	Total Solvent Extractable Tin (ugSn/g dry/wet wt)	n =	Mean length
PH-3A-T-1	WestLochEShoreMangrv	0.39 / 0.062	3	78.33
PH-3A-T-2	WestLochEShoreMangrv	0.28 / 0.045	3	79.66
PH-3A-T-3	WestLochEShoreMangrv	0.40 / 0.064	3	75.00
PH-3A-T-4	WestLochEShoreMangrv	0.26 / 0.042	3	84.33
PH-3A-T-5	WestLochEShoreMangrv	0.21 / 0.034	3	77.66
PH-5A-T-1	Baylet btwn W23-W25	0.45 / 0.072	5	54.40
PH-5A-T-2	Baylet btwn W23-W25	0.36 / 0.058	5	52.00
PH-5A-T-3	Baylet btwn W23-W25	0.39 / 0.062	5	55.60
PH-5A-T-4	Baylet btwn W23-W25	0.31 / 0.050	5	56.40
PH-5A-T-5	Baylet btwn W23-W25	0.28 / 0.045	5	58.00
PH-6A-T-1	WsideFordIsAirFieldA	0.24 / 0.038	15	30.13
PH-6A-T-2	WsideFordIsAirFieldA	0.24 / 0.038	15	28.46
PH-6A-T-3	WsideFordIsAirFieldA	0.21 / 0.034	15	27.33
PH-6A-T-4	WsideFordIsAirFieldA	0.25 / 0.040	15	29.93
PH-6A-T-5	WsideFordIsAirFieldA	0.23 / 0.037	15	28.73
PH-16B-T-1	WsideHECoSheetPiling	0.29 / 0.046	3	83.00
PH-16B-T-2	WsideHECoSheetPiling	0.33 / 0.053	3	84.00
PH-16B-T-3	WsideHECoSheetPiling	0.33 / 0.053	3	76.00
PH-16B-T-4	WsideHECoSheetPiling	0.36 / 0.058	3	76.00
PH-16B-T-5	WsideHECoSheetPiling	0.40 / 0.064	3	74.00
PH-14A-T-1	McGrewPt-N point	0.25 / 0.040	5	67.60
PH-14A-T-2	McGrewPt-N point	0.23 / 0.037	5	62.20
PH-14A-T-3	McGrewPt-N point	0.26 / 0.042	5	51.20
PH-14A-T-4	McGrewPt-N point	0.26 / 0.042	5	50.80
PH-14A-T-5	McGrewPt-N point	0.26 / 0.042	5	52.20

Table C-7(w). Water sample organotin data: Honolulu.

Sample#	Remarks	BuSn	Bu2Sn	Bu3Sn	Total Butyltin (ug/L)
HH-01A-W-1	NEpier@DrawBrdge-NCh	NM	NM	0.086	0.086
HH-01A-W-2	NEpier@DrawBrdge-NCh	NM	NM	0.086	0.086
HH-01A-W-3	NEpier@DrawBrdge-NCh	NM	NM	0.094	0.094
HH-02-W-1	20mSofDil-HamFlDDock	0.035	0.050	0.265	0.345
HH-03-W-1	OffSEendofMatsonPier	0.007	NM	0.139	0.146
HH-04-W-1	AdjPier#7-@HECoDChrg	UN	UN	0.014	0.014
HH-05-W-1	150mEHonoHbrLiteEntr	UN	UN	UN	UN
HH-06-W-1	KewaloBsn-@lngstpier	0.042	NM	0.084	0.126
HH-07-W-1	KewaloBsn-@HTPkrsRWy	0.022	0.024	0.045	0.091
HH-08-W-1	KewaloBsn-@MidEntrCh	0.023	0.029	0.049	0.101

Table C-7(s). Sediment sample organotin data: Honolulu.

Sample#	Remarks	Total Solvent Extractable Tin (ngSn/g)
HH-01-S-1	50mNEofDrawBrdge NCh	33.32
HH-01-S-2	50mNEofDrawBrdge NCh	ND
HH-01-S-3	50mNEofDrawBrdge NCh	ND
HH-02-S-1	20mSofDil-HamFlDDock	689.5
HH-02-S-2	20mSofDil-hamFlDDock	ND
HH-02-S-3	20mSofDil-hamFlDDock	ND
HH-03-S-1	OffSEendofMatsonPier	40.21
HH-03-S-2	OffSEendofMatsonPier	ND
HH-03-S-3	OffSEendofMatsonPier	ND
HH-04-S-1	AdjPier#7-@HECoDChrg	62.53
HH-04-S-2	AdjPier#7-@HECoDChrg	ND
HH-04-S-3	AdjPier#7-@HECoDChrg	ND
HH-05-S-1	150mEHonoHbrLiteEntr	75.61
HH-05-S-2	150mEHonoHbrLiteEntr	ND
HH-05-S-3	150mEHonoHbrLiteEntr	ND
HH-06-S-1	KewaloBsn-@lngstpier	34.82
HH-06-S-2	KewaloBsn-@lngstpier	ND
HH-06-S-3	KewaloBsn-@lngstpier	ND
HH-07-S-1	KewaloBsn-@HTPkrsRWy	209.7
HH-07-S-2	KewaloBsn-@HTPkrsRWy	ND
HH-07-S-3	KewaloBsn-@HTPkrsRWy	ND
HH-08-S-1	KewaloBsn-@MidEntrCh	12.32
HH-08-S-2	KewaloBsn-@MidEntrCh	ND
HH-08-S-3	KewaloBsn-@MidEntrCh	ND

Table C-7(t). Tissue sample organotin data: Honolulu.

Sample#	Remarks	Total Solvent Extractable Tin (ugSn/g dry/wet wt)	n =	Mean length
HH-01A-T-1	@NpierBasculeBridge	7.39 / 1.182	17	29.94
HH-01A-T-2	@NpierBasculeBridge	7.54 / 1.206	17	26.47
HH-01A-T-3	@NpierBasculeBridge	7.60 / 1.216	17	27.64
HH-01A-T-4	@NpierBasculeBridge	6.83 / 1.093	17	26.94
HH-01A-T-5	@NpierBasculeBridge	7.41 / 1.186	17	27.17

Table C-8(w). Water sample organotin data: Mayport.

Sample#	Remarks	BuSn	Bu2Sn	Bu3Sn	Total Butyltin (ug/L)
MA-01-W-1	20mNWBuoy#4@EntrStJohn	0.019	0.015	0.010	0.044
MA-01-W-2	20mNWBuoy#4@EntrStJohn	0.022	0.004	0.016	0.042
MA-01-W-3	20mNWBuoy#4@EntrStJohn	*	*	*	*
MA-02-W-1	AdjBuoy#7@EntrStJohnsR	NM	NM	NM	NM
MA-03-W-1	AdjBuoy#1A@EntrMayptBa	UN	UN	UN	UN
MA-04-W-1	20mSWoT-PierEofPierC-2	UN	UN	UN	UN
MA-04-W-2	20mSWoT-PierEofPierC-2	UN	UN	UN	UN
MA-04-W-3	20mSWoT-PierEofPierC-2	UN	UN	UN	UN
MA-05-W-1	AdjPierD-2MayportBasin	UN	UN	UN	UN
MA-06-W-1	15mAsternoSAMPSONDDG10	UN	UN	UN	UN
MA-06-W-2	15mAsternoSAMPSONDDG10	UN	UN	UN	UN
MA-06-W-3	15mAsternoSAMPSONDDG10	UN	UN	UN	UN
MA-07-W-1	AtCenterofMayportBasin	UN	UN	UN	UN
MA-08-W-1	AdjTangoPierMyprtBasin	UN	UN	UN	UN
MA-08-W-2	AdjTangoPierMyprtBasin	UN	UN	UN	UN
MA-08-W-3	AdjTangoPierMyprtBasin	UN	UN	UN	UN
MA-09-W-1	BtwnC1&C2PrsMyprtBasin	UN	UN	UN	UN
MA-10-W-1	@NendSIMApierMyptBasin	UN	UN	UN	UN
MA-10-W-2	@NendSIMApierMyptBasin	UN	UN	UN	UN
MA-10-W-3	@NendSIMApierMyptBasin	UN	UN	UN	UN
MA-11-W-1	20moffAMIshpydMarRaway	UN	UN	UN	UN
MA-11-W-2	20moffAMIshpydMarRaway	UN	UN	UN	UN
MA-11-W-3	20moffAMIshpydMarRaway	UN	UN	UN	UN
MA-12-W-1	50mNWBuoy#22StJohnsRvr	UN	UN	UN	UN
MA-13-W-1	AdjUSCGpiersStJohnsRvr	NM	NM	NM	NM
MA-13-W-2	AdjUSCGpiersStJohnsRvr	UN	UN	UN	UN
MA-13-W-3	AdjUSCGpiersStJohnsRvr	UN	UN	UN	UN
MA-14-W-1	AdjMontysMarinStJohnsR	UN	UN	UN	UN
MA-14-W-2	AdjMontysMarinStJohnsR	UN	UN	UN	UN
MA-14-W-3	AdjMontysMarinStJohnsR	UN	UN	UN	UN
MA-15-W-1	AdjMayptFerryTStJohnsR	*	*	*	*
MA-16-W-1	25mSofBuoy#11-StJohnsR	UN	UN	UN	UN

Table C-9(w). Water sample organotin data: Charleston.

Sample#	Remarks	BuSn	Bu2Sn	Bu3Sn	Total Butyltin (ug/L)
CS-01-W-1	EntrSjettyadjbuoy#15	UN	UN	UN	UN
CS-01-W-2	EntrSjettyadjbuoy#15	UN	UN	UN	UN
CS-01-W-3	EntrSjettyadjbuoy#15	UN	UN	UN	UN
CS-01A-W-1	Entr jetty @ Buoy#19	NM	UN	NM	NM
CS-02-W-1	adjFt.Sumter150mN#23	UN	UN	UN	UN
CS-03-W-1	Marina@brdgeSulIsNrw	UN	UN	UN	UN
CS-04-W-1	Toddlers Cove Marina	UN	UN	NM	NM
CS-05-W-1	EntrSullivansIs@mkrC	LOST	LOST	LOST	-----
CS-06-W-1	CharlestonMuniMarina	NM	UN	0.009	0.009
CS-06-W-2	CharlestonMuniMarina	NM	UN	0.009	0.009
CS-06-W-3	CharlestonMuniMarina	NM	UN	0.009	0.009
CS-07-W-1	CoastGuardStaPierAsh	UN	NM	NM	NM
CS-08-W-1	AdjBuoy#2offCBattery	UN	UN	UN	UN
CS-09-W-1	50mSofMuniPieroffBat	UN	UN	UN	UN
CS-10-W-1	MuniDock(offCustomHs	UN	UN	UN	UN
CS-11-W-1	OffNTugPier-MuniPier	UN	UN	UN	UN
CS-12-W-1	AdjTownCreekBoatYard	UN	UN	UN	UN
CS-13-W-1	NendDrumIs@unmkdMrkr	UN	UN	UN	UN
CS-14-W-1	@EntrtoShipyardCreek	0.006	0.007	0.031	0.044
CS-15-W-1	ChstnNavSta@BOQMarna	LOST	LOST	LOST	-----
CS-16-W-1	EntrYellowHouseCreek	UN	UN	UN	UN
CS-16-W-2	EntrYellowHouseCreek	UN	UN	UN	UN
CS-16-W-3	EntrYellowHouseCreek	UN	UN	UN	UN
CS-17-W-1	OffSternAFDM2:mid-ch	UN	UN	UN	UN
CS-17-W-2	OffSternAFDM2:mid-ch	UN	UN	UN	UN
CS-17-W-3	OffSternAFDM2:mid-ch	UN	UN	UN	UN
CS-18-W-1	GooseCrk25moffBoatHs	NM	UN	UN	NM
CS-19-W-1	SendPrtTerm@PulpMill	NM	UN	UN	NM
CS-20-W-1	20moffendDPierChNSYd	NM	UN	UN	NM
CS-20-W-2	20moffendDPierChNSYd	NM	UN	UN	NM
CS-20-W-3	20moffendDPierChNSYd	UN	UN	UN	UN
CS-21-W-1	ChstnNSYD-btwnDryDks	UN	UN	UN	UN
CS-21-W-2	ChstnNSYD-btwnDryDks	NM	UN	UN	NM
CS-21-W-3	ChstnNSYD-btwnDryDks	UN	UN	UN	UN
CS-22-W-1	20mfmEendHPier@AFDM3	UN	UN	UN	UN
CS-22-W-2	20mfmEendHPier@AFDM3	UN	UN	UN	UN
CS-22-W-3	20mfmEendHPier@AFDM3	UN	UN	UN	UN
CS-23-W-1	20mfmEendPPierNavSta	UN	UN	UN	UN
CS-24-W-1	OffmouthClouterCreek	UN	UN	UN	UN
CS-24-W-2	OffmouthClouterCreek	UN	UN	UN	UN
CS-24-W-3	OffmouthClouterCreek	UN	UN	UN	UN
CS-25-W-1	SofUPier-outbdMS0490	UN	UN	UN	UN
CS-25-W-2	SofUPier-outbdMS0490	UN	UN	UN	UN
CS-25-W-3	SofUPier-outbdMS0490	UN	UN	UN	UN

Table C-10(w). Water sample organotin data: Norfolk.

Sample#	Remarks	BuSn	Bu2Sn	Bu3Sn	Total Butyltin (ug/L)
NF1-01-W-1	ENTR-250mNEofBuoy#1	NM	UN	UN	NM
NF1-01-W-2	ENTR-250mNEofBuoy#1	NM	UN	UN	NM
NF1-01-W-3	ENTR-250mNEofBuoy#1	NM	UN	NM	NM
NF1-02-W-1	AdjBuoy#3NWSewellsPt	UN	UN	UN	UN
NF1-03-W-1	AdjPier#12-30mSSide	NM	UN	UN	NM
NF1-04-W-1	NSC/NOB Rnge@Pier#4	NM	UN	UN	NM
NF1-05-W-1	150mWofNorfkHbrReach	NM	UN	UN	NM
NF1-06-W-1	midwybtwnH&IBuoysRng	NM	UN	NM	NM
NF1-07-W-1	AdjSTankeroffCraneyI	0.029	0.007	0.060	0.096
NF1-08-W-1	AdjAFDM#10@D&SPiers	NM	UN	UN	NM
NF1-10-W-1	LambertBend@Buoy#29	NM	UN	UN	NM
NF1-11-W-1	TownPoint adjBuoy#36	NM	NM	0.044	0.044
NF1-12-W-1	EBrElizabethR@4thBrg	NM	UN	NM	NM
NF1-13-W-1	@commercialfltgDryDk	NM	UN	NM	NM
NF1-14-W-1	adjNORSHIPCO-2ndPier	0.045	0.028	0.110	0.183
NF1-15-W-1	SBrElizabethR@4thBrg	NM	UN	0.010	0.010
NF1-16-W-1	SBrElizabethR@Buell	NM	UN	NM	NM
NF1-17-W-1	SBrElizabethR@ParaCk	NM	UN	0.039	0.039
NF1-18-W-1	15mEofDDk#8(NNSY)Rng	0.019	NM	0.033	0.052
NF1-19-W-1	30mSEofSlip#3(NNSY)	0.021	NM	0.040	0.061
NF1-19-W-2	30mSEofSlip#3(NNSY)	0.007	NM	0.026	0.033
NF1-20-W-1	100mSEofSlip#3(NNSY)	0.009	UN	0.020	0.029
NF1-21-W-1	InsideofSlip#2(NNSY)	0.063	0.016	0.048	0.127
NF1-22-W-1	NASMarina/WillobyBay	0.123	0.011	0.012	0.146
NF1-23-W-1	NewportNewsPoint/Bar	NM	UN	UN	NM
NF1-24-W-1	NewportNewsSlipwy#12	UN	UN	UN	UN
NF1-25-W-1	JamesRiverBrdgCntrPr	UN	UN	UN	UN
NF1-25-W-2	JamesRiverBrdgCntrPr	UN	UN	UN	UN
NF1-25-W-3	JamesRiverBrdgCntrPr	UN	UN	UN	UN
NF1-26-W-1	JamesRBrdg@NasewaySh	UN	UN	UN	UN
NF1-27-W-1	NewportNews@CVApiers	UN	UN	UN	UN
NF1-28-W-1	NewportNews@midpier	UN	UN	UN	UN
NF1-29-W-1	15mERedLtHseHamptonR	NM	UN	UN	NM
NF1-29-W-2	15mERedLtHseHamptonR	UN	UN	UN	UN
NF1-29-W-3	15mERedLtHseHamptonR	UN	UN	UN	UN
NF1-30-W-1	D&SPiers-adjSpruance	NM	UN	UN	NM
NF1-30-W-2	D&SPiers-adjSpruance	NM	UN	UN	NM
NF1-30-W-3	D&SPiers-adjSpruance	NM	UN	UN	NM
NF1-31-W-1	PortsmthYachtHbrCntr	0.017	0.011	0.023	0.051
NF1-32-W-1	So.EndPortsmouthQuay	0.017	0.010	0.099	0.126

Table C-10(s). Sediment sample organotin data: Norfolk.

Sample#	Remarks	Total Solvent Extractable Tin (ngSn/g)
NF1-01-S-1	EntrCh250mNEofBuoy#1	<3.0
NF1-01-S-2	EntrCh250mNEofBuoy#1	ND
NF1-01-S-3	EntrCh250mNEofBuoy#1	ND
NF1-02-S-1	NofSewellsPt @Buoy#3	<3.0
NF1-02-S-2	NofSewellsPt @Buoy#3	ND
NF1-02-S-3	NofSewellsPt @Buoy#3	ND
NF1-03-S-1	SewellsPtSsidePier12	<3.0
NF1-03-S-2	SewellsPtSsidePier12	ND
NF1-03-S-3	SewellsPtSsidePier12	ND
NF1-04-S-1	NSC/NOB Rnge @Pier#4	ND
NF1-04-S-2	NSC/NOB Rnge @Pier#4	ND
NF1-04-S-3	NSC/NOB Rnge @Pier#4	<3.0
NF1-05-S-1	150mWofNorfkHbrReach	ND
NF1-05-S-2	150mWofNorfkHbrReach	9.42
NF1-05-S-3	150mWofNorfkHbrReach	6.41
NF1-06-S-1	MidwybtwnH&IBuoysRng	ND
NF1-06-S-2	MidwybtwnH&IBuoysRng	15.68
NF1-06-S-3	MidwybtwnH&IBuoysRng	3.23
NF1-07-S-1	AdjSWTankeroffCraney	20.3
NF1-07-S-2	AdjSWTankeroffCraney	ND
NF1-07-S-3	AdjSWTankeroffCraney	41.25
NF1-08-S-1	AdjAFDM#10 @D&SPiers	ND
NF1-08-S-2	AdjAFDM#10 @D&SPiers	<3.0
NF1-08-S-3	AdjAFDM#10 @D&SPiers	ND
NF1-09-S-1	AdjBuoy#14-offCraney	<3.0
NF1-09-S-2	AdjBuoy#14-offCraney	ND
NF1-09-S-3	AdjBuoy#14-offCraney	ND
NF1-10-S-1	LambertBend @Buoy#29	ND
NF1-10-S-2	LambertBend @Buoy#29	7.76
NF1-10-S-3	LambertBend @Buoy#29	25.25
NF1-11-S-1	TownPoint adjBuoy#36	ND
NF1-11-S-2	TownPoint adjBuoy#36	10.33
NF1-11-S-3	TownPoint adjBuoy#36	ND
NF1-12-S-1	EBrElizabethR@4thBdg	<3.0
NF1-12-S-2	EBrElizabethR@4thBdg	ND
NF1-12-S-3	EBrElizabethR@4thBdg	ND
NF1-13-S-1	@commercialfltgDrydk	42.59
NF1-13-S-2	@commercialfltgDrydk	ND
NF1-13-S-3	@commercialfltgDrydk	224.6
NF1-14-S-1	adjNORSHIPCO-2ndPier	19.75
NF1-14-S-2	adjNORSHIPCO-2ndPier	9.09
NF1-14-S-3	adjNORSHIPCO-2ndPier	ND
NF1-15-S-1	SBrElizabethR@4thBrg	<3.0
NF1-15-S-2	SBrElizabethR@4thBrg	ND
NF1-15-S-3	SBrElizabethR@4thBrg	ND
NF1-16-S-1	SBrElizabethR @Buell	ND
NF1-16-S-2	SBrElizabethR @Buell	12.46
NF1-16-S-3	SBrElizabethR @Buell	10.90

Table C-10(s). Sediment sample organotin data: Norfolk (continued).

Sample#	Remarks	Total Solvent Extractable Tin (ngSn/g)
NF1-17-S-1	SBrElizabethR@ParaCk	20.1
NF1-17-S-2	SBrElizabethR@ParaCk	ND
NF1-17-S-3	SBrElizabethR@ParaCk	18.99
NF1-18-S-1	15mEofDDk#8(NNSY)Rng	96.35
NF1-18-S-2	15mEofDDk#8(NNSY)Rng	139.6
NF1-18-S-3	15mEofDDk#8(NNSY)Rng	ND
NF1-19-S-1	30mSEofSlip#3 (NNSY)	ND
NF1-19-S-2	30mSEofSlip#3 (NNSY)	155.9
NF1-19-S-3	30mSEofSlip#3 (NNSY)	79.59
NF1-20-S-1	100mSEofSlip#3(NNSY)	93.62
NF1-20-S-2	100mSEofSlip#3(NNSY)	38.47
NF1-20-S-3	100mSEofSlip#3(NNSY)	ND
NF1-21-S-1	Inside Slip#2 (NNSY)	38.02
NF1-21-S-2	Inside Slip#2 (NNSY)	84.99
NF1-21-S-3	Inside Slip#2 (NNSY)	ND
NF1-22-S-1	NASMarina/WillobyBay	<3.0
NF1-22-S-2	NASMarina/WillobyBay	ND
NF1-22-S-3	NASMarina/WillobyBay	ND
NF1-23-S-1	NewportNewsPoint/Bar	13.40
NF1-23-S-2	NewportNewsPoint/Bar	12.02
NF1-23-S-3	NewportNewsPoint/Bar	ND
NF1-24-S-1	NewportNewsSlipWy#12	35.83
NF1-24-S-2	NewportNewsSlipWy#12	12.91
NF1-24-S-3	NewportNewsSlipWy#12	ND
NF1-25-S-1	JamesRiverBrdgCntrPr	<3.0
NF1-25-S-2	JamesRiverBrdgCntrPr	ND
NF1-25-S-3	JamesRiverBrdgCntrPr	ND
NF1-26-S-1	JamesRBrdg@NasewaySh	<3.0
NF1-26-S-2	JamesRBrdg@NasewaySh	ND
NF1-26-S-3	JamesRBrdg@NasewaySh	ND
NF1-27-S-1	NewportNews@CVApiers	6.00
NF1-27-S-2	NewportNews@CVApiers	2.63
NF1-27-S-3	NewportNews@CVApiers	ND
NF1-28-S-1	NewportNews@mid(VPA)	16.44
NF1-28-S-2	NewportNews@mid(VPA)	8.38
NF1-28-S-3	NewportNews@mid(VPA)	ND
NF1-29-S-1	15mERedLtHseHamptonR	ND
NF1-29-S-2	15mERedLtHseHamptonR	ND
NF1-29-S-3	15mERedLtHseHamptonR	<3.0
NF1-30a-S-1	1stCivPierSofD&SPers	<3.0
NF1-30a-S-2	1stCivPierSofD&SPers	ND
NF1-30a-S-3	1stCivPierSofD&SPers	ND
NF1-31-S-1	CtrPortsmuthYachtHbr	9.67
NF1-31-S-2	CtrPortsmuthYachtHbr	<3.0
NF1-31-S-3	CtrPortsmuthYachtHbr	ND
NF1-32-S-1	So.endPortsmouthquay	49.71
NF1-32-S-2	So.endPortsmouthquay	18.02
NF1-32-S-3	So.endPortsmouthquay	ND

Table C-10(t). Tissue sample organotin data: Norfolk

Sample#	Remarks	Total Solvent Extractable Tin (ugSn/g dry/wet wt)	n	Mean length
NFl-13A-T-1	EBrElizabethR2ndBrdg	2.76 / 0.442	1	82.00
NFl-13A-T-2	EBrElizabethR2ndBrdg	3.64 / 0.582	1	75.00
NFl-13A-T-3	EBrElizabethR2ndBrdg	4.25 / 0.680	1	91.00
NFl-13A-T-4	EBrElizabethR2ndBrdg	4.14 / 0.662	1	92.00
NFl-13A-T-5	EBrElizabethR2ndBrdg	2.31 / 0.370	1	72.00
NFl-15-T-1	SBrElizabethR4thBrdg	1.90 / 0.304	1	92.00
NFl-15-T-2	SBrElizabethR4thBrdg	1.90 / 0.304	1	84.00
NFl-15-T-3	SBrElizabethR4thBrdg	1.80 / 0.288	1	88.00
NFl-15-T-4	SBrElizabethR4thBrdg	2.11 / 0.338	1	81.00
NFl-15-T-5	SBrElizabethR4thBrdg	1.55 / 0.248	1	74.00
NFl-17A-T-1	SBrElizabethR3rdBrdg	3.70 / 0.592	1	82.00
NFl-17A-T-2	SBrElizabethR3rdBrdg	3.24 / 0.518	1	81.00
NFl-17A-T-3	SBrElizabethR3rdBrdg	4.09 / 0.654	1	84.00
NFl-17A-T-4	SBrElizabethR3rdBrdg	7.45 / 1.192	1	96.00
NFl-17A-T-5	SBrElizabethR3rdBrdg	3.37 / 0.539	1	79.00
NFl-23-T-1	OffNewportNewsPoint	0.71 / 0.114	1	81.00
NFl-23-T-2	OffNewportNewsPoint	0.71 / 0.114	1	76.00
NFl-23-T-3	OffNewportNewsPoint	0.73 / 0.117	1	70.00
NFl-23-T-4	OffNewportNewsPoint	0.60 / 0.096	1	72.00
NFl-23-T-5	OffNewportNewsPoint	0.82 / 0.131	1	60.00
NFl-25-T-1	JamesRiverBridgeCntr	0.86 / 0.138	1	87.00
NFl-25-T-2	JamesRiverBridgeCntr	0.92 / 0.147	1	82.00
NFl-25-T-3	JamesRiverBridgeCntr	0.66 / 0.106	1	78.00
NFl-25-T-4	JamesRiverBridgeCntr	0.64 / 0.102	1	66.00
NFl-25-T-5	JamesRiverBridgeCntr	0.67 / 0.107	1	65.00
NFl-28-T-1	OffNewportNewsMiddle	4.21 / 0.674	1	81.00
NFl-28-T-2	OffNewportNewsMiddle	4.96 / 0.794	1	74.00
NFl-28-T-3	OffNewportNewsMiddle	5.11 / 0.818	1	60.00
NFl-28-T-4	OffNewportNewsMiddle	5.43 / 0.869	1	70.00
NFl-28-T-5	OffNewportNewsMiddle	5.83 / 0.933	1	64.00
NFl-29-T-1	NwprtNewsShlsLiteHse	1.07 / 0.171	1	86.00
NFl-29-T-2	NwprtNewsShlsLiteHse	1.86 / 0.298	1	73.00
NFl-29-T-3	NwprtNewsShlsLiteHse	0.52 / 0.083	1	78.00
NFl-29-T-4	NwprtNewsShlsLiteHse	0.63 / 0.101	1	72.00
NFl-29-T-5	NwprtNewsShlsLiteHse	0.57 / 0.091	1	70.00
NFl-32-T-1	So.EndPortsmouthQuay	5.37 / 0.859	1	80.00
NFl-32-T-2	So.EndPortsmouthQuay	6.41 / 1.026	1	73.00
NFl-32-T-3	So.EndPortsmouthQuay	5.90 / 0.994	1	78.00
NFl-32-T-4	So.EndPortsmouthQuay	5.92 / 0.947	1	63.00
NFl-32-T-5	So.EndPortsmouthQuay	7.85 / 1.256	1	89.00

Table C-11(w). Water sample organotin data: Little Creek.

Sample#	Remarks	BuSn	Bu2Sn	Bu3Sn	Total Butyltin (ug/L)
LC1-01-W-1	EntrChBtwnChMkrs#1&2	NM	UN	NM	NM
LC1-02-W-1	150m SE ofChMarker#4	UN	UN	UN	UN
LC1-03-W-1	150m NE ofChMarker#8	NM	UN	UN	NM
LC1-03A-W-1	20ftdeep@Ch.Marker#8	NM	UN	0.014	0.014
LC1-04-W-1	DesertCove@LCMRepFac	NM	UN	UN	NM
LC1-05-W-1	100mWofOpsCntrlTower	NM	UN	0.026	0.026
LC1-06-W-1	SoEndLittleCreekCove	NM	UN	NM	NM
LC1-07-W-1	CenterPhibGruTwoPier	NM	NM	NM	NM
LC1-08-W-1	AdjMarRailwyTermPier	NM	UN	NM	NM
LC1-08-W-2	20ftdeep@RwyTermPier	ND	ND	ND	ND
LC1-09-W-1	AdjFlDryDock@Pier#10	NM	UN	NM	NM
LC1-09A-W-1	AdjSmlBoatLaunchRamp	NM	UN	NM	NM
LC1-10-W-1	AdjCenterLST Pier#14	NM	UN	UN	NM
LC1-11-W-1	Entr Fishermans Cove	NM	UN	0.020	0.020
LC1-12-W-1	AdjAssaultCraftUnit2	0.018	NM	0.041	0.059
LC1-13-W-1	@NewMarinaSlipFishCv	0.017	NM	0.020	0.037
LC1-13-W-2	@7ft@NewMarinaSlipFC	0.011	NM	0.023	0.034
LC1-13A-W-1	@MidPierunderHwy60Br	ND	ND	ND	ND

Table C-11(s). Sediment sample organotin data: Little Creek.

Sample#	Remarks	Total Solvent Extractable Tin (ngSn/g)
LC1-01-S-1	EntrChBtwnChMkrs#1&2	UN
LC1-01-S-2	EntrChBtwnChMkrs#1&2	0.7
LC1-01-S-3	EntrChBtwnChMkrs#1&2	1.56
LC1-02-S-1	150m SE EntrChMkr#4h	1.82
LC1-02-S-2	150m SE Entr.ChMkr#4	ND
LC1-02-S-3	150m SE Entr.ChMkr#4	ND
LC1-03-S-1	150m NE Entr.ChMkr#8	2.32
LC1-03-S-2	150m NE Entr.ChMkr#8	UN
LC1-03-S-3	150m NE Entr.ChMkr#8	2.22
LC1-04-S-1	DesertCove@LCMRepFac	UN
LC1-04-S-2	DesertCove@LCMRepFac	ND
LC1-04-S-3	DesertCove@LCMRepFac	ND
LC1-05-S-1	100mWofOpsControlTwr	6.91
LC1-05-S-2	100mWofOpsControlTwr	ND
LC1-05-S-3	100mWofOpsControlTwr	ND
LC1-06-S-1	EendLCreekCoveMDSU-2	20.53
LC1-06-S-2	EendLCreekCoveMDSU-2	ND
LC1-06-S-3	EendLCreekCoveMDSU-2	ND
LC1-07-S-1	EntrLCreekCove(Cntr)	28.65
LC1-07-S-2	EntrLCreekCove(Cntr)	ND
LC1-07-S-3	EntrLCreekCove(Cntr)	ND
LC1-08-S-1	AdjMarRailwyTermPier	19.60
LC1-08-S-2	AdjMarRailwyTermPier	16.36
LC1-08-S-3	AdjMarRailwyTermPier	12.00
LC1-09-S-1	AdjFlDryDock@Pier#10	42.96
LC1-09-S-2	AdjFlDryDock@Pier#10	ND
LC1-09-S-3	AdjFlDryDock@Pier#10	ND
LC1-10-S-1	Adj2CenterLSTpier#10	5.75
LC1-10-S-2	Adj2CenterLSTpier#10	ND
LC1-10-S-3	Adj2CenterLSTpier#10	ND
LC1-11-S-1	Entr Fishermans Cove	12.30
LC1-11-S-2	Entr Fishermans Cove	ND
LC1-11-S-3	Entr Fishermans Cove	ND
LC1-12-S-1	AdjAssaultCraftUnit2	4.79
LC1-12-S-2	AdjAssaultCraftUnit2	ND
LC1-12-S-3	AdjAssaultCraftUnit2	ND
LC1-13-S-1	7ft@NewMarinaFishCve	UN
LC1-13-S-2	7ft@NewMarinaFishCve	UN
LC1-13-S-3	7ft@NewMarinaFishCve	UN

Table C-11(t). Tissue sample organotin data: Little Creek.

Sample#	Remarks	Total Solvent Extractable Tin (ugSn/g dry/wet wt)	n =	Mean length
LC1-03B-T-1	AcrossChfromChMkr#8	0.61 / 0.098	1	72.00
LC1-03B-T-2	AcrossChfromChMkr#8	1.04 / 0.166	1	86.00
LC1-03B-T-3	AcrossChfromChMkr#8	0.78 / 0.125	1	83.00
LC1-03B-T-4	AcrossChfromChMkr#8	0.44 / 0.070	1	74.00
LC1-03B-T-5	AcrossChfromChMkr#8	0.57 / 0.091	1	62.00
LC1-07A-T-1	MiddlePhibGruTwoPier	0.82 / 0.131	1	99.00
LC1-07A-T-2	MiddlePhibGruTwoPier	1.22 / 0.195	1	91.00
LC1-07A-T-3	MiddlePhibGruTwoPier	0.78 / 0.125	1	88.00
LC1-07A-T-4	MiddlePhibGruTwoPier	0.90 / 0.144	1	90.00
LC1-07A-T-5	MiddlePhibGruTwoPier	1.17 / 0.187	1	81.00
LC1-09A-T-1	AdjBoatLauchFacility	0.70 / 0.112	1	58.00
LC1-09A-T-2	AdjBoatLauchFacility	0.87 / 0.139	1	59.00
LC1-09A-T-3	AdjBoatLauchFacility	0.74 / 0.118	1	56.00
LC1-09A-T-4	AdjBoatLauchFacility	0.87 / 0.139	1	69.00
LC1-09A-T-5	AdjBoatLauchFacility	0.88 / 0.141	1	79.00
LC1-13A-T-1	AdjMidPierUnderHwy60	1.55 / 0.248	1	65.00
LC1-13A-T-2	AdjMidPierUnderHwy60	ND / ND	1	70.00
LC1-13A-T-3	AdjMidPierUnderHwy60	1.26 / 0.202	1	58.00

Table C-12(w). Water sample organotin data: Philadelphia.

Sample#	Remarks	BuSn	Bu2Sn	Bu3Sn	Total Butyltin (ug/L)
PA-01-W-1	15moffCaissonDDk#4PNSY	UN	UN	UN	UN
PA-01-W-2	15moffCaissonDDk#4PNSY	UN	UN	UN	UN
PA-01-W-3	15moffCaissonDDk#4PNSY	UN	UN	UN	UN
PA-02-W-1	CtrResBasn100mSofWrf#N	UN	UN	UN	UN
PA-03-W-1	AdjBuoy#1@jncSchuylkil	UN	UN	UN	UN
PA-03-W-2	AdjBuoy#1@jncSchuylkil	UN	UN	UN	UN
PA-03-W-3	AdjBuoy#1@jncSchuylkil	UN	UN	UN	UN
PA-04-W-1	10moffSpier@Ft.Mifflin	UN	UN	UN	UN
PA-05-W-1	15moffCaissonDDk#5PNSY	UN	UN	UN	UN
PA-06-W-1	10moffCaissonDDk#3PNSY	UN	UN	UN	UN
PA-06-W-2	10moffCaissonDDk#3PNSY	UN	UN	UN	UN
PA-06-W-3	10moffCaissonDDk#3PNSY	UN	UN	UN	UN
PA-07-W-1	100moffCaisonDDk#1PNSY	UN	UN	UN	UN
PA-08-W-1	10moffendPier#7LeagueI	UN	UN	UN	UN
PA-09-W-1	10moffCoGardQuay@Gl.Pt	NM	NM	UN	NM
PA-09-W-2	10moffCoGardQuay@Gl.Pt	NM	NM	UN	NM
PA-09-W-3	10moffCoGardQuay@Gl.Pt	NM	NM	UN	NM
PA-10-W-1	5moffCtrBldg@PackerMar	NM	NM	UN	NM
PA-11-W-1	10moffPier40SPhilaWhrf	NM	UN	NM	NM
PA-12-W-1	CtrofPenn'sLndngMarina	NM	NM	UN	NM
PA-12-W-2	CtrofPenn'sLndngMarina	NM	NM	UN	NM
PA-12-W-3	CtrofPenn'sLndngMarina	NM	NM	UN	NM

Table C-13(w). Water sample organotin data: New London/Groton.

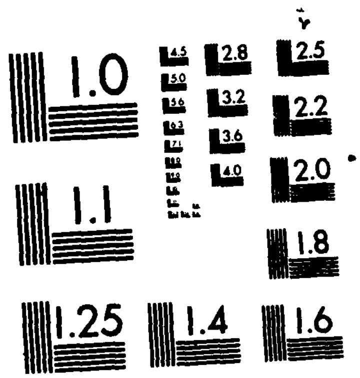
Sample#	Remarks	BuSn	Bu2Sn	Bu3Sn	Total Butyltin (ug/L)
NL1-01-W-1	AdjBuoy#3-EntThamesR	0.033	UN	UN	0.033
NL1-01-W-2	AdjBuoy#3-EntThamesR	0.005	UN	UN	0.005
NL1-01-W-3	AdjBuoy#3-EntThamesR	0.029	UN	UN	0.029
NL1-02-W-1	AdjBuoys#5&6-ThamesR	UN	UN	UN	UN
NL1-03-W-1	OffPfizerChemicalCo	0.017	UN	UN	0.017
NL1-04-W-1	OffSoNUSCPierThamesR	NM	UN	UN	NM
NL1-04-W-2	OffSoNUSCPierThamesR	NM	UN	UN	NM
NL1-04-W-3	OffSoNUSCPierThamesR	NM	UN	UN	NM
NL1-05-W-1	OffCanBuoy#11ThamesR	NM	UN	UN	NM
NL1-06-W-1	OffGenDynmx@CntrPier	NM	UN	UN	NM
NL1-06-W-2	OffGenDynmx@CntrPier	NM	UN	UN	NM
NL1-06-W-3	OffGenDynmx@CntrPier	UN	UN	UN	UN
NL1-07-W-1	SsideCntrRRBrgeHwy95	0.011	UN	UN	0.011
NL1-07-W-2	SsideCntrRRBrgeHwy95	NM	UN	UN	NM
NL1-07-W-3	SsideCntrRRBrgeHwy95	NM	UN	UN	NM
NL1-08-W-1	Adj2USCGdAcademyPier	NM	UN	UN	NM
NL1-09-W-1	Adj2Buoy#9ThamesRivr	UN	UN	UN	UN
NL1-10-W-1	EndPier#2SubaseNLndn	UN	UN	UN	UN
NL1-10-W-2	EndPier#2SubaseNLndn	0.006	UN	UN	0.006
NL1-10-W-3	EndPier#2SubaseNLndn	UN	NM	UN	NM
NL1-11-W-1	AdjMidChMkr#5Boathse	NM	NM	UN	NM
NL1-11-W-2	AdjMidChMkr#5Boathse	NM	NM	UN	NM
NL1-11-W-3	AdjMidChMkr#5Boathse	0.004	UN	UN	0.004
NL1-12-W-1	SoSpecSerMarina&DPDO	NM	NM	UN	NM
NL1-13-W-1	NSidePier#33SubaseNL	UN	UN	UN	UN
NL1-13-W-2	NSidePier#33SubaseNL	UN	UN	UN	UN
NL1-13-W-3	NSidePier#33SubaseNL	UN	UN	UN	UN
NL1-14-W-1	@FuelPierWbankThamzR	NM	NM	UN	NM
NL1-15-W-1	@QuaySsidePier17ARDM	NM	NM	UN	NM
NL1-16-W-1	25mNARDM4(Birmngham)	0.004	UN	UN	0.004
NL1-16-W-2	25mNARDM4(Birmngham)	NM	NM	UN	NM
NL1-16-W-3	25mNARDM4(Birmngham)	NM	NM	UN	NM
NL1-17-W-1	10mEBuoy#11-WBankThR	UN	UN	UN	UN
NL1-18-W-1	10moffEendPier#12ThR	UN	UN	UN	UN
NL1-19-W-1	10moffEendPier#10ThR	UN	UN	UN	UN
NL1-19-W-2	10moffEendPier#10ThR	UN	UN	UN	UN
NL1-19-W-3	10moffEendPier#10ThR	UN	UN	UN	UN
NL1-20-W-1	NsidePier#8AdjBldg20	UN	UN	UN	UN
NL1-21-W-1	@CrockrShpYdShawCove	0.005	NM	NM	0.005
NL1-21-W-2	@CrockrShpYdShawCove	NM	NM	NM	NM
NL1-21-W-3	@CrockrShpYdShawCove	0.005	NM	NM	0.005
NL1-22-W-1	CenterofBurr'sMarina	0.012	NM	0.008	0.020
NL1-22-W-2	CenterofBurr'sMarina	0.012	0.002	0.006	0.020
NL1-22-W-3	CenterofBurr'sMarina	0.011	0.002	0.009	0.022

Table C-14(w). Water sample organotin data: Newport.

Sample#	Remarks	BuSn	Bu2Sn	Bu3Sn	Total Butyltin (ug/L)
NP-01-W-1	250mSSEofBuoy#6-EntrCh	UN	UN	UN	UN
NP-01-W-2	250mSSEofBuoy#6-EntrCh	UN	UN	UN	UN
NP-01-W-3	250mSSEofBuoy#6-EntrCh	UN	UN	UN	UN
NP-02-W-1	CtrCastleHillCGStaCove	UN	0.019	0.130	0.149
NP-03-W-1	100mNBuoy#4offFt.Adams	UN	UN	UN	UN
NP-03-W-2	100mNBuoy#4offFt.Adams	UN	UN	UN	UN
NP-03-W-3	100mNBuoy#4offFt.Adams	UN	UN	UN	UN
NP-04-W-1	250NNWIdaLewisRockPier	UN	UN	UN	UN
NP-05-W-1	10mSofNewportCommWharf	UN	NM	NM	NM
NP-06-W-1	CtrNewportYtClubMarina	NM	NM	0.008	0.008
NP-06-W-2	CtrNewportYtClubMarina	NM	NM	0.008	0.008
NP-06-W-3	CtrNewportYtClubMarina	NM	NM	0.010	0.010
NP-07-W-1	CtrNewportOffshoreBWrx	UN	0.005	UN	0.005
NP-08-W-1	CtrNwptNavyMarinaOClub	UN	NM	NM	NM
NP-09-W-1	S-endCdingtnCove@Buoys	UN	NM	NM	NM
NP-10-W-1	30moffNUSCPier(@FF1056	NM	UN	UN	NM
NP-10-W-2	30moffNUSCPier(@FF1056	----	----	----	LOST
NP-10-W-3	30moffNUSCPier(@FF1056	NM	NM	UN	NM
NP-11-W-1	WsideGouldIsoffoldpilz	UN	UN	UN	UN
NP-11-W-2	WsideGouldIsoffoldpilz	NM	UN	UN	NM
NP-11-W-3	WsideGouldIsoffoldpilz	NM	UN	UN	NM
NP-12-W-1	CtrBendBoatBasinMarina	0.024	0.010	0.028	0.062
NP-12-W-2	CtrBendBoatBasinMarina	0.028	0.022	0.038	0.088
NP-12-W-3	CtrBendBoatBasinMarina	0.040	0.026	0.042	0.108

AD-A181 202 BUTYLTIN CONCENTRATIONS IN SELECTED US HARBOR SYSTEMS A 3/3
BASELINE ASSESSMENT(U) NAVAL OCEAN SYSTEMS CENTER SAN
DIEGO CA J G GROVHOUG ET AL. APR 87 NOSC/TR-1155

UNCLASSIFIED F/G 11/3 NL



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

Table C-15(w). Water sample organotin data: Portsmouth.

Sample#	Remarks	BuSn	Bu2Sn	Bu3Sn	Total Butyltin (ug/L)
PT-01-W-1	100mWofBuoy#2EntrChanl	UN	UN	UN	UN
PT-01-W-2	100mWofBuoy#2EntrChanl	UN	UN	UN	UN
PT-01-W-3	100mWofBuoy#2EntrChanl	UN	UN	UN	UN
PT-02-W-1	10mEofCoastGdPier-FtPt	UN	UN	UN	UN
PT-03-W-1	CenterofPepperrelCove	NM	UN	UN	NM
PT-03-W-2	CenterofPepperrelCove	NM	UN	NM	NM
PT-03-W-3	CenterofPepperrelCove	NM	UN	NM	NM
PT-04-W-1	CenterofOldNavySndBasn	UN	UN	NM	NM
PT-04-W-2	CenterofOldNavySndBasn	UN	UN	UN	UN
PT-04-W-3	CenterofOldNavySndBasn	UN	UN	UN	UN
PT-05-W-1	20moffCasonDryDk#2PNSY	UN	NM	UN	NM
PT-06-W-1	AdjBerth11CNofFltIrnPr	UN	UN	UN	UN
PT-06-W-2	AdjBerth11CNofFltIrnPr	UN	UN	UN	UN
PT-06-W-3	AdjBerth11CNofFltIrnPr	UN	UN	UN	UN
PT-07-W-1	15mNofPieroffBerth#14	UN	UN	UN	UN
PT-08-W-1	AdjPrescottParkMarRWay	UN	UN	UN	UN
PT-09-W-1	Badger'sIsMarina(Cntr)	0.006	NM	NM	0.006
PT-09-W-2	Badger'sIsMarina(Cntr)	NM	UN	UN	NM
PT-09-W-3	Badger'sIsMarina(Cntr)	UN	UN	UN	UN
PT-10-W-1	JerrysMarina-SpinneyCr	UN	UN	UN	UN
PT-11-W-1	WsideFoxPt-AdjEntrLBay	NM	NM	NM	NM
PT-11-W-2	WsideFoxPt-AdjEntrLBay	NM	NM	UN	NM
PT-11-W-3	WsideFoxPt-AdjEntrLBay	NM	NM	NM	NM
PT-12-W-1	GreatBayMarinaBroadBay	UN	UN	UN	UN

APPENDIX D

PROPOSED MONITORING STATIONS

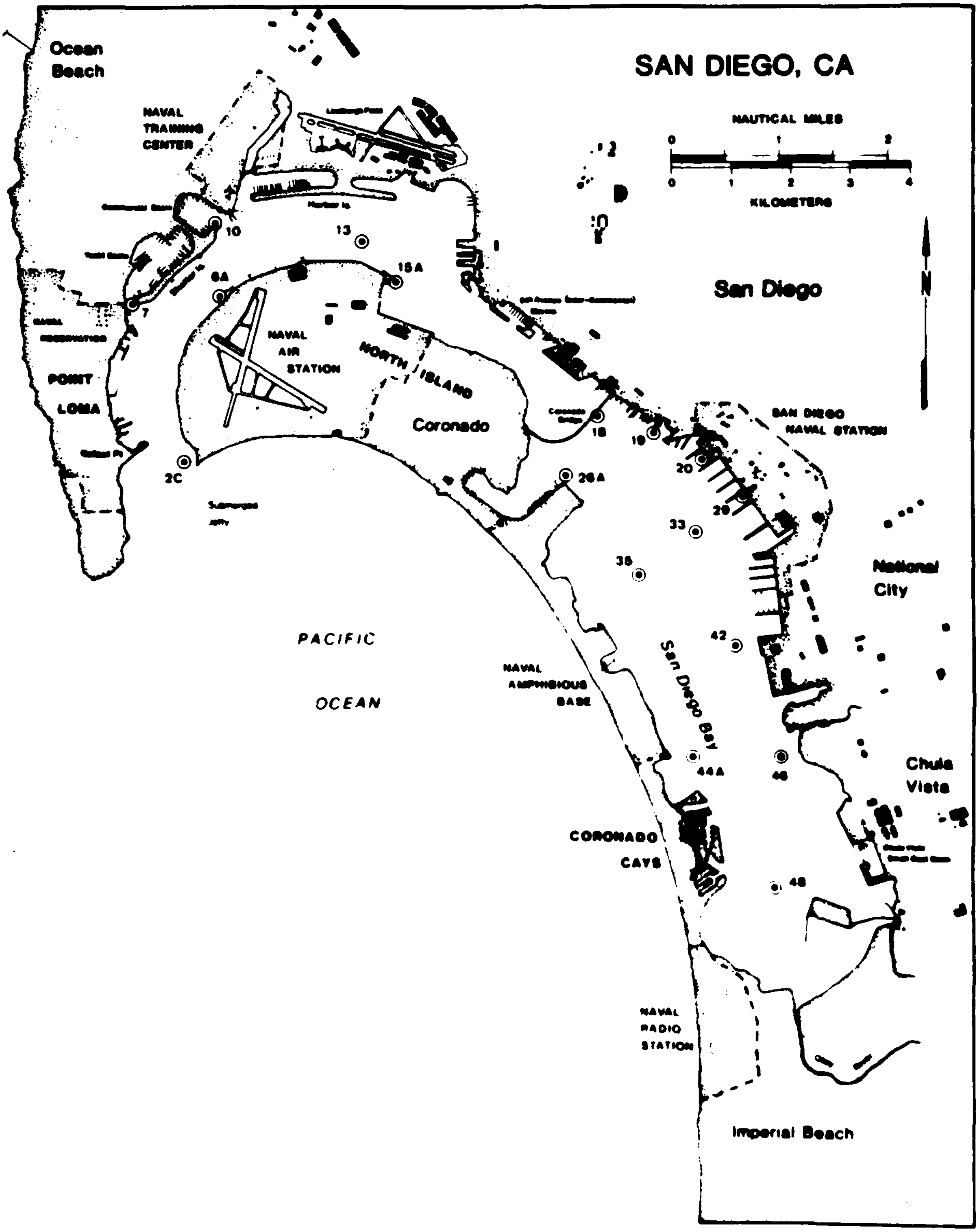


Figure D-1 Proposed monitoring stations San Diego Bay

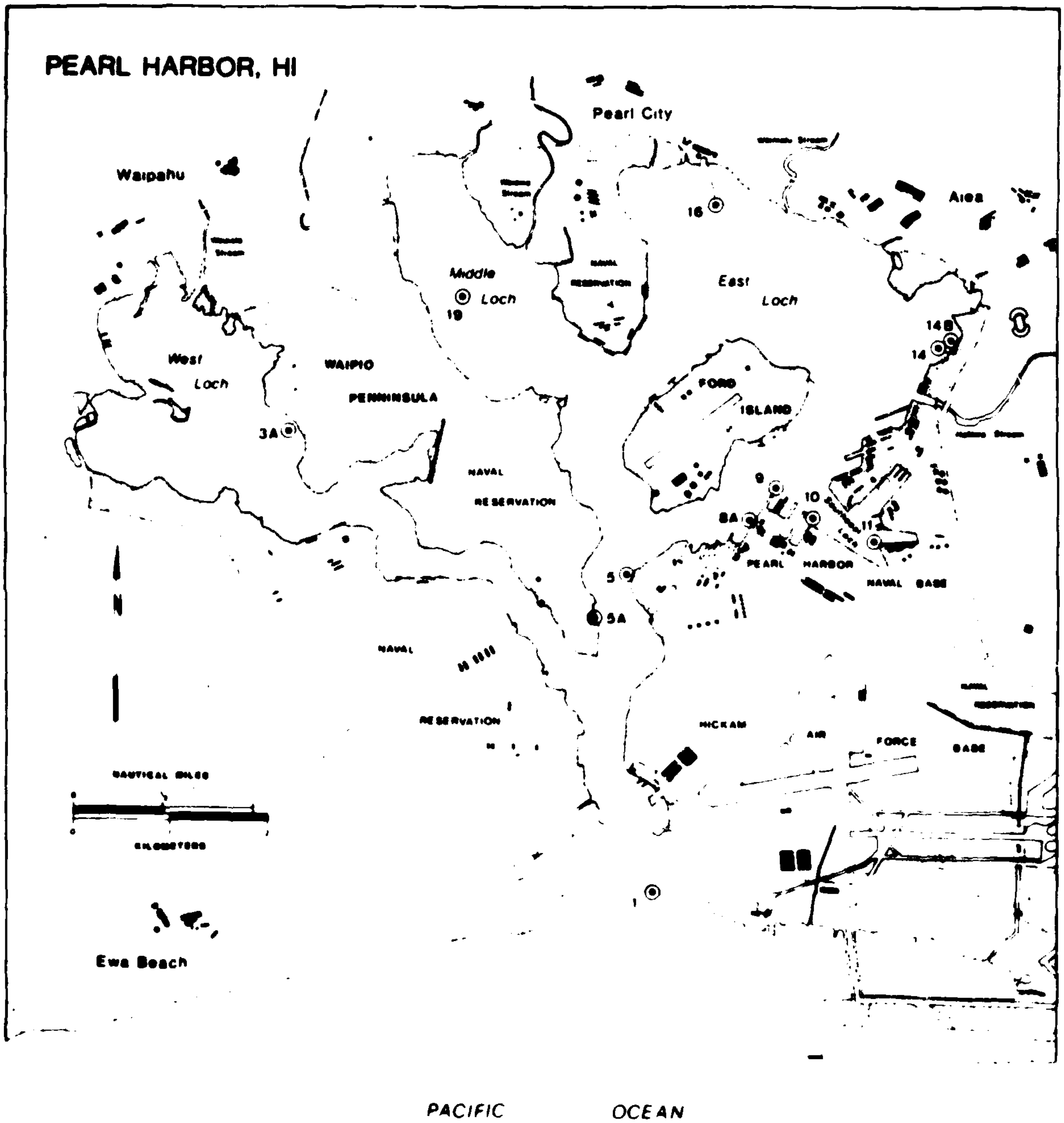


Figure D-2 Proposed monitoring stations Pearl Harbor

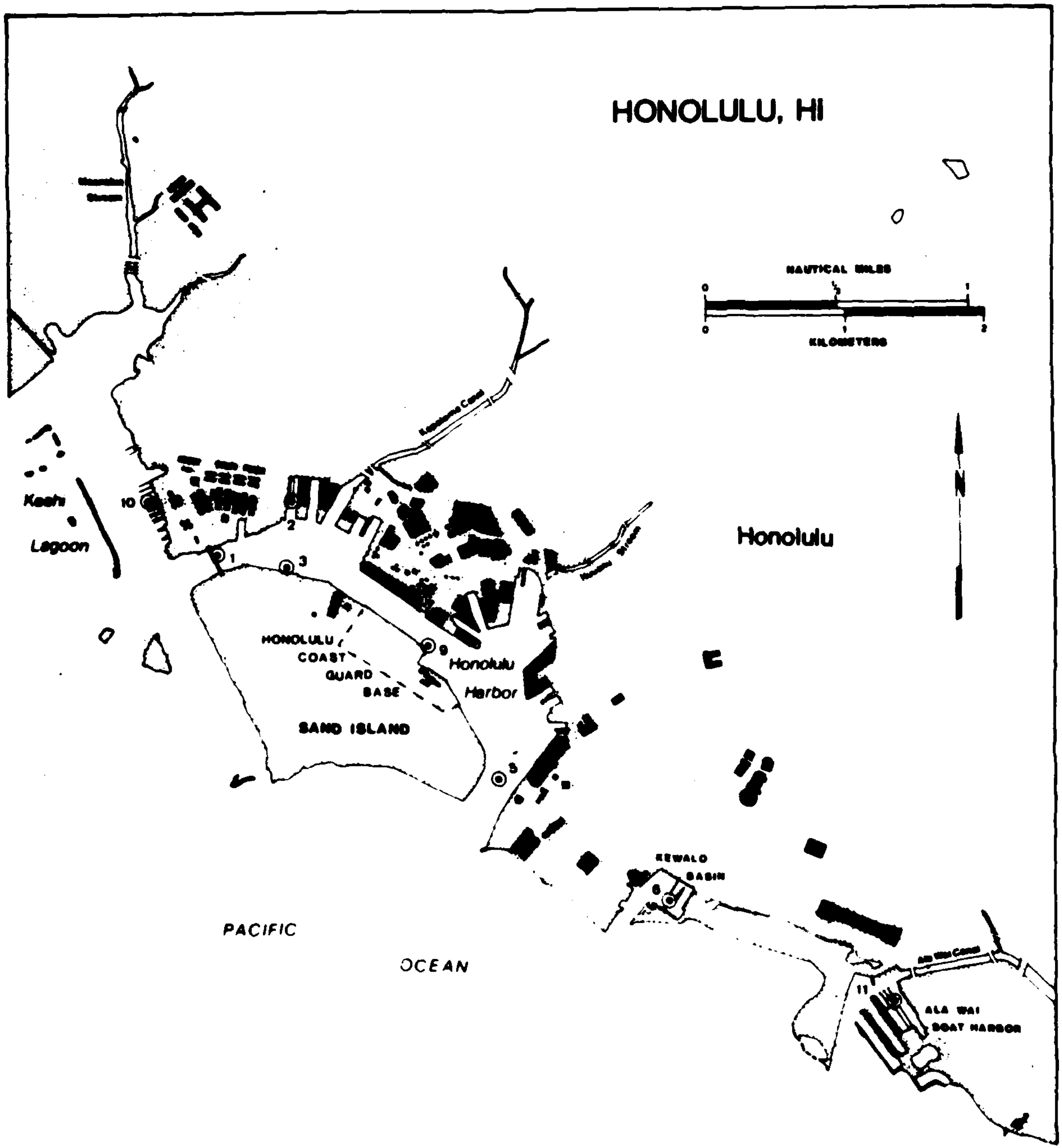


Figure D-3. Proposed monitoring stations Honolulu.

END

7-87

DTIC